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A Magazine for the Scanner Hobbyist

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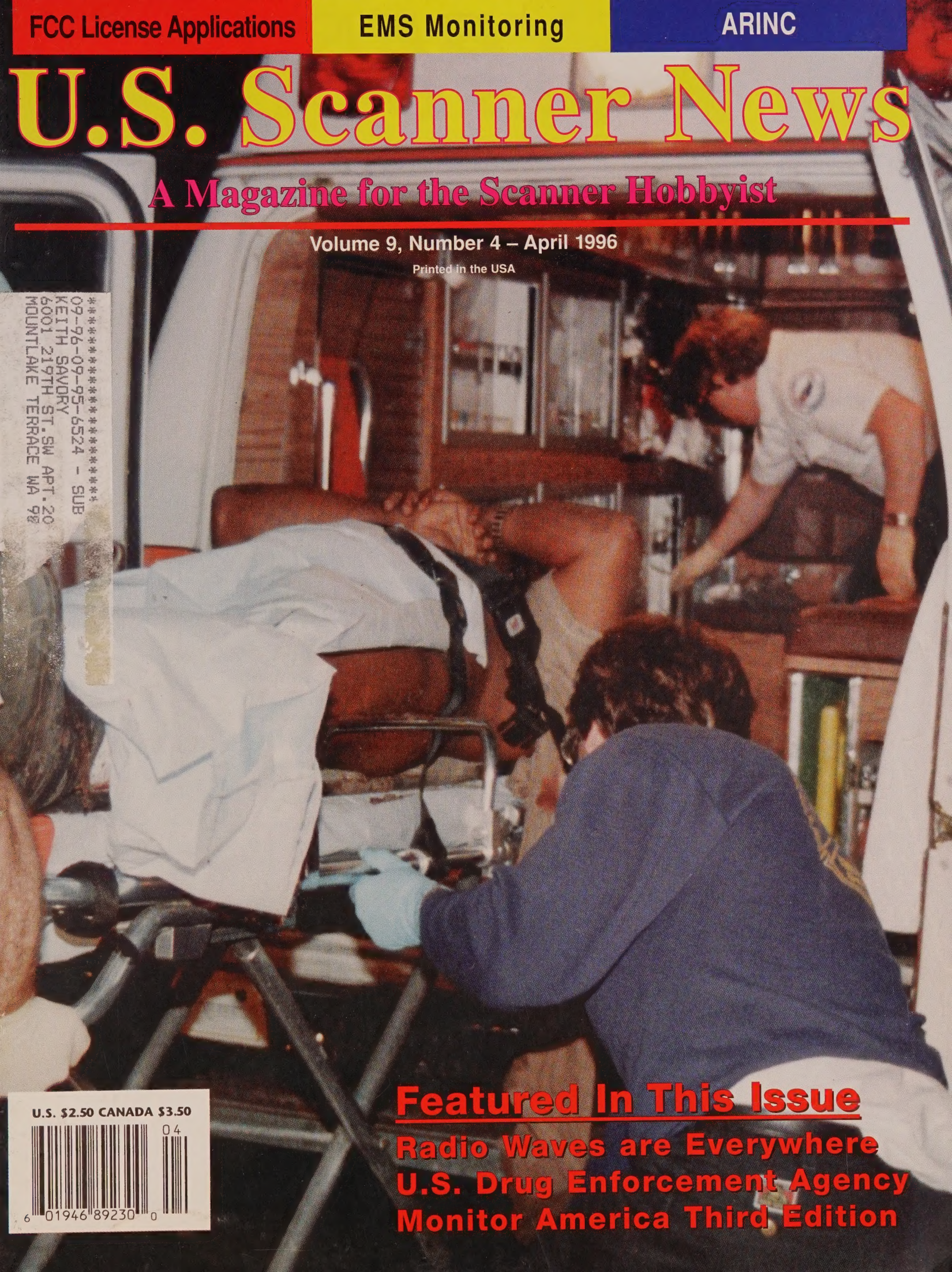

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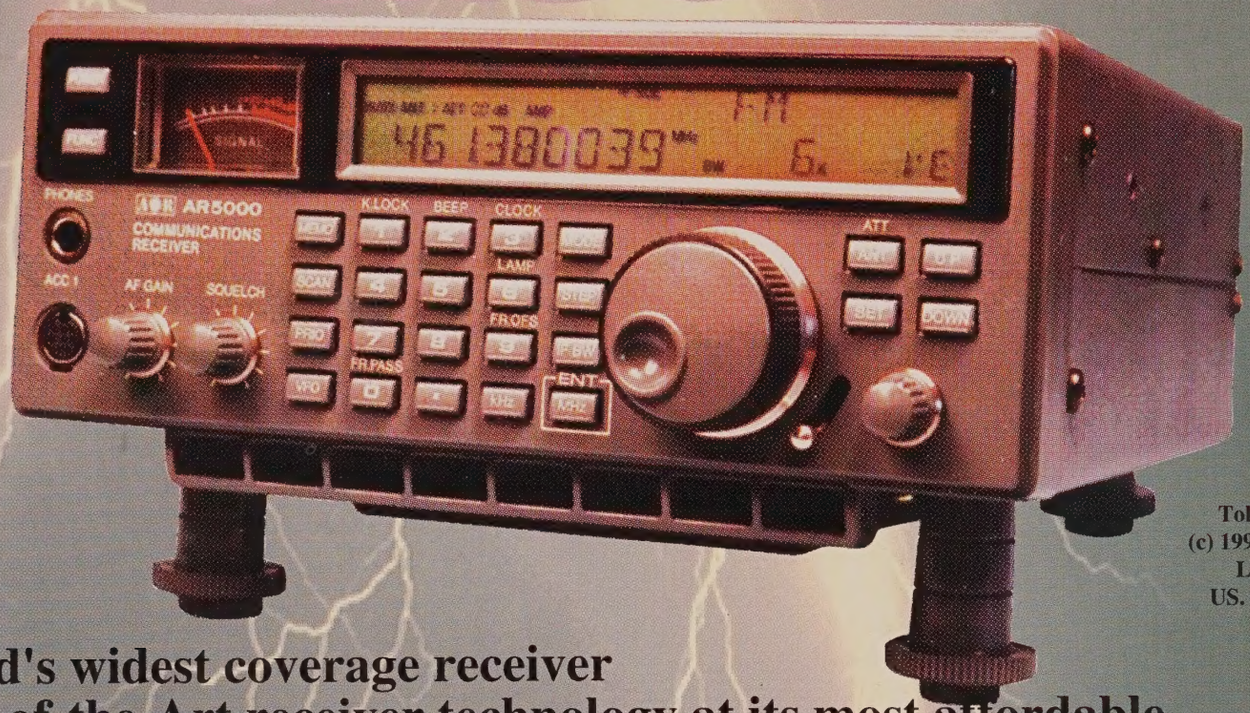

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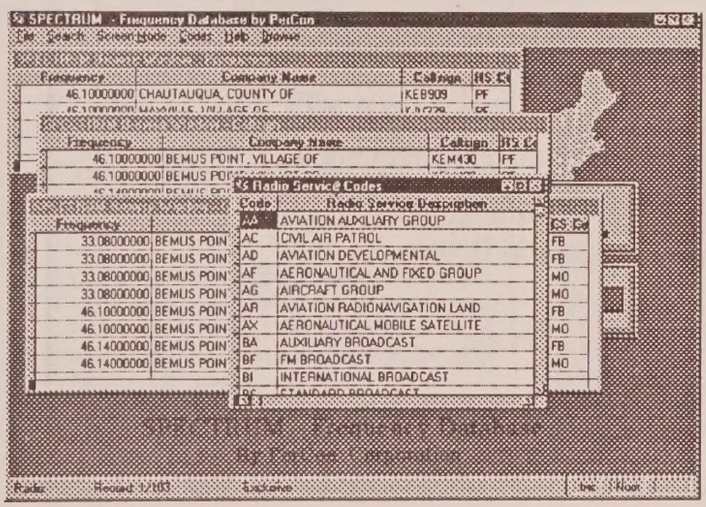

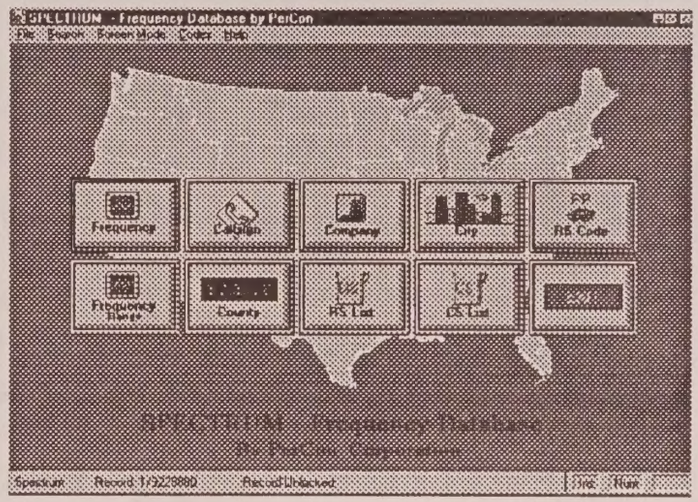

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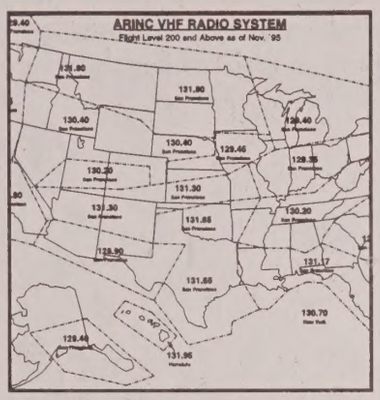

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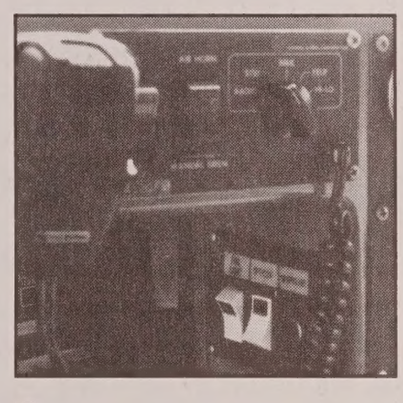

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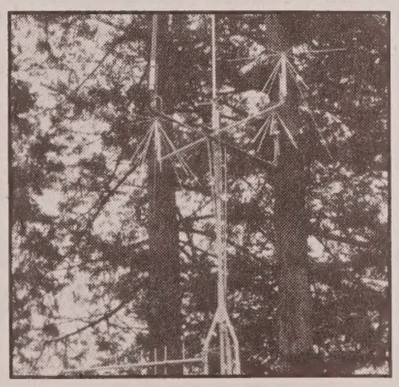

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Emergency Medical Service

You can hear it, faint at first, somewhere out on the far reaches of the wind, a siren calling with that haunting heart-pumping wail that seems to just go on and on. You listen, trying to determine who the siren belongs to. Then you know. It's a motor vehicle accident, three victims, one with no pulse or respiation. Read about it on Page 8.

Photo by Gordon T. Allen

Feature Story

ARINC– Aeronautical Radio Inc.

Aeronautical enroute frequencies are used by airlines to manage their day to day operations.

by Ed Muro

Recently, when approaching Miami International, a business aircraft pilot wishing to expedite a refueling stop, decided to call ahead to get things organized. He called the F.B.O. (Fixed Base Operator) on 132.000 MHz and advised the operator of his schedule. The refueling went as planned and the flight resumed without a hitch.

About two weeks later, the pilot received "greetings" from the Federal Communications Commission, alleging that he was in violation of the Commissions rules for transmitting on a frequency that he was not assigned to. "Well, certainly the FCC should know better than that," he muttered, "after all, they are the ones who issued my license."

He quickly made a call to the local FCC field office and discovered slight gaps in his radio knowledge. He learned that there are 128 VHF frequencies that sit in the middle of the VHF air band that are set aside for something other than air traffic control, advisory, search and rescue, or flight instruction. The FCC calls them "aeronautical enroute" frequencies. The airlines call then "company radio" frequencies and some people refer to them as "ARINC" frequencies. The last two terms are not official and cause endless confusion and misunderstanding.

The aeronautical enroute frequencies start at 128.825 MHz and end at 132.000 MHz. The band is divided into 128 channels spaced 25 kHz apart. Additional channels were allocated a few years ago in the band from 136.500 through 136.975. The strange part of this story is that the typical aircraft transceiver can be programmed to all 128 of the aeronautical enroute channels and yet there is no warning to the pilot that he may be tuned to a frequency on which he is not authorized to operate.

The task of the aircraft operator who wishes to become licensed to use the enroute frequencies is eased somewhat by the fact that almost all aeronautical enroute ground stations in the United States are licensed to Aeronautical Radio, Inc. (ARINC). To reduce confusion the FCC requires the aircraft radio station applicant to obtain coordination from ARINC.

Who needs to use these frequencies anyway? The airlines are the principal users and they use them to manage the myriad details associated with their day-to-day operations; however, they do not have exclusive use of them. The FCC requires the licensee of aeronautical enroute stations to provide, without discrimination, all necessary non-public service to any aircraft station licensee who has made appropriate arrangements (See 47 CFR 87.261).

In the past several years some fixed-base operators seeking relief from over-crowded advisory (UNICOM) frequencies have arranged through ARINC to have an aeronautical enroute station assigned for air-ground communications support of their operations. The set-up for an FCC violation is thereby created for the unsuspecting pilot who tunes to an aeronautical enroute frequency when contacting such FBO's.

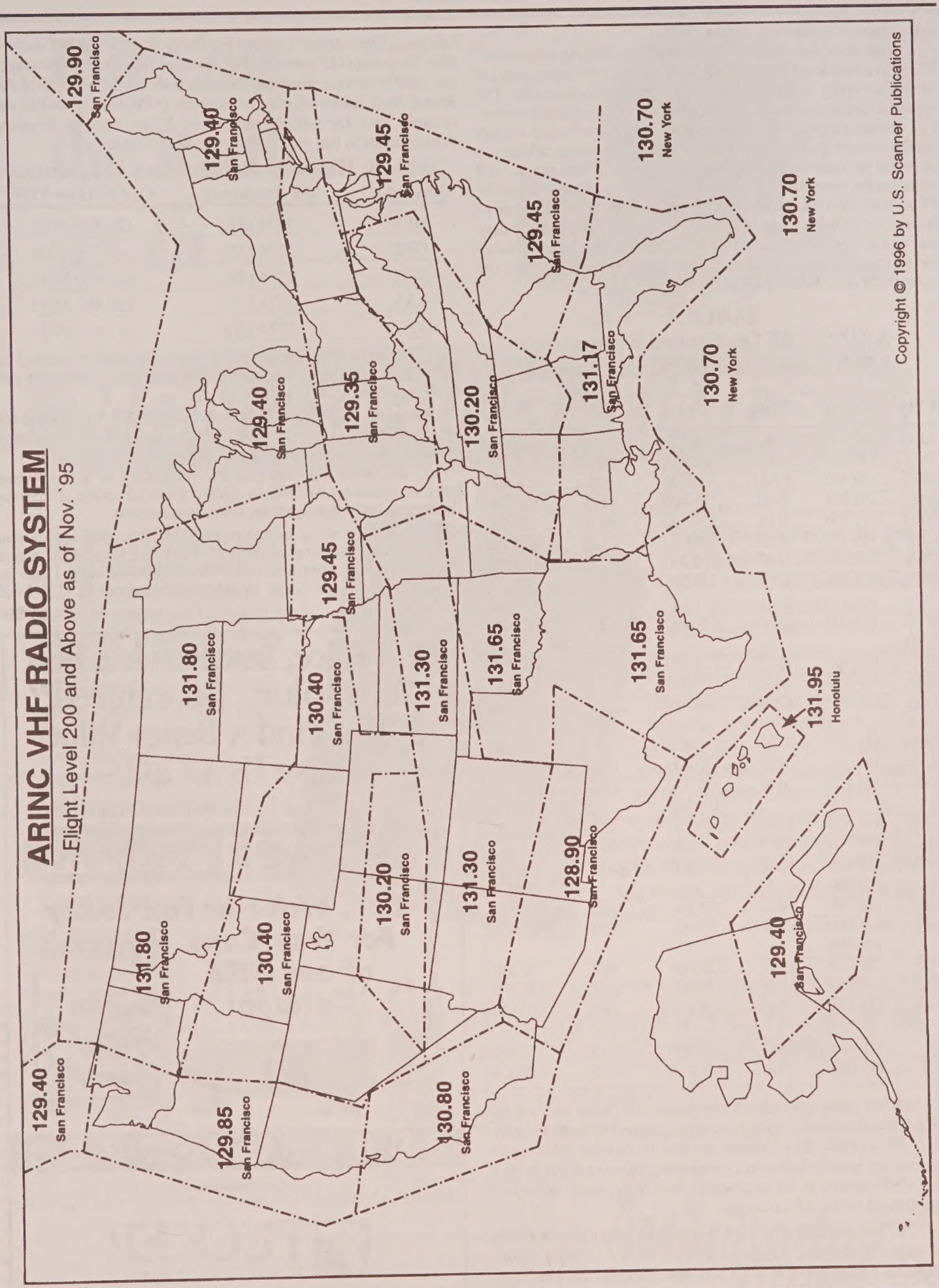
Since aeronautical enroute stations are not provided by the government, the users must share in the financial liabilities that arise. Aircraft operators making contact with enroute stations may expect to receive an invoice for services, such as relaying messages, rendered on a per-call basis if they do not have a service contract.

Many ARINC stations are staffed by airlines or organizations such as the FBO mentioned earlier. Some of those organizations have elected to absorb all radio station costs, provided that the communications pertain to the mutual activities of the aircraft operator calling the station and the organization staffing the station.

As far as the Federal Communications Commission is concerned, however, you either make the necessary application for authorization to use the frequencies or you keep off of them. Beware of that surprise greeting, telling you that you have broken the rules by transmitting on an unauthorized frequency.

Aeronautical Radio, Inc. is dedicated to serving the communications needs of the air transport community. ARINC owns and operates a nationwide VHF air-ground-air communications network which provides communications service to aircraft operating over oceanic routes via long range HF and extended-range VHF from ARINC gateway stations. This furnishes inter-airline data communications via one of the largest private electronic message switching and processing systems in existence. Through the provision of a nationwide private line, inter-city network, ARINC has made it possible for aircraft operators and others closely associated with air transportation to satisfy their radio, telephone, and data (ACARS) requirements economically.

ARINC was organized in 1929, with the airlines being the principal owners and users. Since its earliest days, its services have been extended to all aircraft operators, large or small, domestic or foreign, business, private, or governmental. All are served on a not-for-profit basis with charges for service based on cost


ARINC VHF RADIO SYSTEM
Flight Level 200 and Above as of Nov. `95
129.90 San Francisco
129.40 San Francisco
129.45 San Francisco
130.70 New York
130.70 New York
129.45 San Francisco
131.17 San Francisco
130.70 New York
129.40 San Francisco
129.35 San Francisco
130.20 San Francisco
129.45 San Francisco
131.80 San Francisco
130.40 San Francisco
131.30 San Francisco
131.65 San Francisco
131.65 San Francisco
131.95 Honolulu
130.20 San Francisco
131.30 San Francisco
128.90 San Francisco
131.80 San Francisco
130.40 San Francisco
129.40 San Francisco
129.40 San Francisco
129.85 San Francisco
130.80 San Francisco
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What does this mean to the aircraft monitoring enthusiast? There is a whole gamut of communications to monitor outside of the normally associated air traffic control operations. The types of communications you might monitor on these frequencies would include fuel, weather, position reports and aircraft performance reports. There may be communications relating to onboard services and supplies, such as food and drink, and requests for services at the gate for persons with special needs. Pilots may also wish to communicate with their administrative bosses in regards to handling specific customers and they may wish to notify the home office of delays. In any event, monitoring these frequencies should give you an inside view of the operations of providing air service.

TABLE A: ARINC VHF On-Ground Frequencies ARINC International Oceanic Service

City	Freq.	City	Freq.	City	Freq.
ABQ	131.300	AMA	131.650	ANC	129.400
ACV	129.850	ATL	129.450	BGM	129.400
BGR	129.400	BHM	130.200	BIL	131.800
BOI	130.400	BOS	129.400	BNA	130.200
BTM	131.800	BTV	129.400	BUF	129.400
CHS	129.450	CID	129.450	CMH	129.350
CRW	130.200	CPR	130.400	CVG	129.350
DCA	129.450	DEN	130.200	DFW	131.650
					128.900
DTW	129.400	EKO	130.400	ELP	128.900
YVR					
ELY	130.400	ESC	129.400	FAT	130.800
FSD	131.800	GDT	130.700	GEG	131.800
GJT	130.200	GRR	129.400	GTF	131.800
TYS					
HRL	131.650	IAD	130.425	IAH	131.650
ICT	131.300	IDA	130.400	IND	129.350
JAX	131.175	JFK	129.450	JNU	129.400
			129.900		
LAX	130.850	LGA	129.350	LIT	130.200
MAF	128.900	MCI	131.300	MFR	129.850
MIA	131.175	MSP	131.800	MSY	131.175
	130.700				
NAS	130.700	OKC	131.650	OMA	129.450
ORD	129.35 / 129.4	ORF	129.45	PDT	130.450
	129.450				
PDX	129.850	PHX	128.900	PIT	129.350
RAP	131.800	RDM	130.400	RNO	130.400
SAT	131.650	SEA	129.850	SFO	130.800
TUL					
SJU	130.700	SLC	130.400	SMX	130.850
STL	131.650	TPA	131.175	TUS	128.900

ARINC also provides long-range HF radio service for international oceanic voice communications via centers located in New York, San Francisco, and Honolulu. VHF radio stations are installed at select coastal locations in order to provide VHF service as far as possible into the oceanic areas as a supplement to the HF coverage.

The HF service provided not only handles flight regularity messages (company business, known as the Central Office Dispatch Drop Service [CODD] and handled by the Long Distance Operational Control Facilities [LDOCF]) but there is also a separate HF network that handles flight safety messages (air traffic service messages, handled on the Major World Air Route Area radio-telephone network [MWARA]) within the oceanic area for which the United States Federal Aviation Administration has air traffic control responsibility.

Table B: HF (SSB) Ramp-Check Frequencies

Airport ID	HF Frequency	Call SFO on VHF
DFW	5574 kHz	128.900 MHz
ORD	5574 kHz	129.350 MHz
SEA	5574 kHz	129.850 MHz
LAX	5574 kHz	130.800 MHz
STL	5574 kHz	131.650 MHz

There are also unpublished phone numbers located in New York, San Francisco, and Honolulu where callers can call in to reach the CODD network.

Over the Pacific the VHF frequency of 128.950 is used for air to air chit chat, while over the North Atlantic the frequency is 131.800.

It has been reported that the frequency of 129.450 has been assigned by ARINC to United Parcel Service (UPS) for "company" communications with their aircraft.

If you have never monitored ARINC it might provide you with hours of listening enjoyment. Feel free to drop me a line if you have any comments or transmission reports. I can be reached via the internet at: ny041ed@aol.com or by U.S. Mail at U.S.S.N. HQ.

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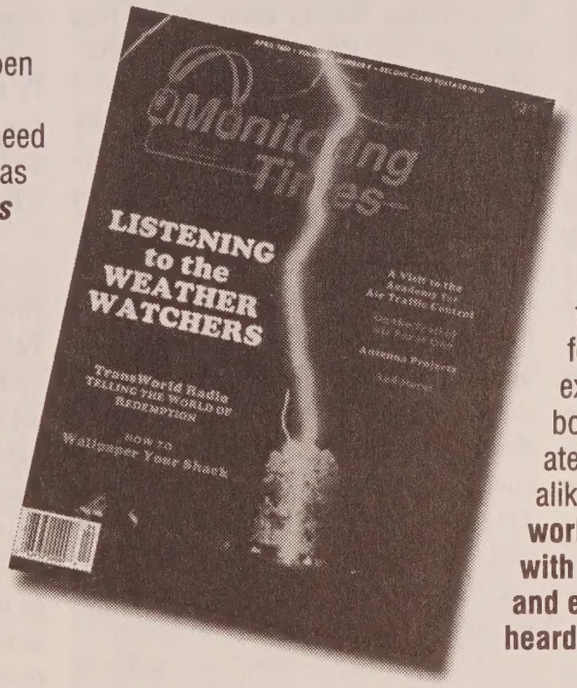

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Monitoring Times

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Cover Story

EMS Behind The Siren

An in–depth look at the Emergency Medical Service.

by Laura Quarantiello

You can hear it, faint at first, somewhere out on the far reaches of the wind; a siren calling with that haunting heart-pumping wail that seems to just go on and on. You listen, trying to determine who the siren belongs to. Is it Police? Highway Patrol? Fire? All the way across the room from the scanner you listen, like someone might listen closely to the voice of a loved one. It's not the yelp of a police unit, not the hi-lo warble of a highway patrol car, it's a wail.the wail of an ambulance. You're sure of it and you switch on the scanner, let it cycle through the hot bank of emergency frequencies until it stops on fire dispatch. Then you know you're right. The dispatcher is updating the paramedic crew on their call. It's a motor vehicle accident, three victims, one with no pulse or respiration. CPR in progress. Will he make it? There's no telling, but one thing is for sure; if you stay tuned to your scanner, you'll hear the fight for life from the accident scene to the ER doors. There is nothing so arresting and immediate as the life-and-death drama of emergency medicine.

The EMS System

Each year, more than 150,000 people die from trauma and another 400,000 receive permanent injuries, making trauma the fourth largest cause of death in the United States. Reducing these numbers by saving lives is the job of Emergency Medical Services (EMS). The EMS team forms the critical link between a trauma scene and hospital emergency room care.

In 1863, the International Red Cross was formed in Switzerland to care for wounded soldiers. American Nurse Clara Barton brought the Red Cross to the United States in 1905. Since then, this organization has trained millions in first aid and emergency care. Following World War II, fire departments nationwide began to adopt ambulance units within their ranks. Unfortunately, crews were only trained to load patients and transport them to hospitals for professional care. It was only in the 1950's that a gradual change to more advanced field care began. The National Highway Safety Act of 1966 charged the Department of Transportation (DOT) with developing and implementing an Emergency Medical Services system to provide much-needed prehospital care.

The EMS system as we now know it serves one primary purpose; to improve a trauma victim's chances of survival by extending the level of hospital emergency room care out into the field. To this end, there are several levels of EMS training. The First Responder is trained in basic first aid, such as cardiopulmonary resuscitation (CPR) and may be a firefighter, police officer or ordinary citizen. A First Responder is often the first person to reach an injured person and the aid rendered can be critical to patient survival.

The next level is the Emergency Medical Technician (EMT). The basic level EMT is the EMT-A (or EMT-1), who has completed a minimum DOT 110-hour course. (Some states may require additional hours.) The secondary level is the EMT-I (or EMT-2) who is trained in intermediate or advanced life support measures such as IV therapy, field drugs, and cardiac rescue. At the pinnacle of EMS training is the EMT-P, more commonly known as a Paramedic.

In most areas, the EMS system is closely tied to the fire department, with firefighters trained to EMT or Paramedic standards and manning ambulances or rescue squads based at area fire stations. These units are dispatched by the fire department. In many cases, private ambulance services also exist, based in other locations, with EMT-staffed units available to respond to non-emergency transport and emergency transport calls. These are usually dispatched by a private dispatcher not affiliated with the fire department.

Call-Out: The EMS System in Action

Each time an emergency call goes out for an EMS unit, a ten-step sequence of events occurs. Though the sequence may vary slightly in different jurisdictions in accordance with local protocols, these ten steps are standard throughout the industry.

1–Receiving the Call. All emergency responses start with a call for help. Most areas of the country are equipped with the 911 emergency number system, allowing quick and easy alerting

of the need for assistance. Other areas rely on direct seven-digit numbers. Regardless, all EMS calls are routed to the appropriate dispatcher who determines the following: Exact location of the patient; phone number and name of the caller; the caller's perception of the patient's problem; specific information on the condition of the patient; additional information specific to the type of incident (if a motor vehicle accident, number of cars involved, number of victims, is anyone trapped, are there hazards such as downed power lines, etc.). The dispatcher's job after obtaining this introductory information is to immediately determine who the closest units are and dispatch them to the scene. A secondary, but no less important job is to assist the caller in caring for the patient until help arrives. Dispatchers are trained in giving pre-arrival instructions.

2–Arriving at the Scene. While enroute, the EMS team may receive updates from the dispatcher via radio if the condition of the patient changes or if additional information is obtained (details on nature of injury, location of patient, etc.) Upon arrival, EMTs inform the dispatcher and then immediately perform a scene survey, which is a quick assessment of the environment (are there environmental dangers, such as a fuel spill or toxic chemicals? Are police vehicles present, indicating a crime? Is traffic being controlled? Is there a fire?).

3–Controlling the Scene. When EMTs arrive on the scene, they become responsible for controlling patient care. This may mean being briefed by a first responder, asking law enforcement or fire personnel for assistance in scene stabilization or equipment needs, and talking to bystanders for information.

4–Conducting the Primary Survey. If the patient is conscious, the EMT will introduce him or herself and ask for the patient's name. At this point, patient assessment begins, starting with the Primary Survey. The Primary consists of identifying any life-threatening injuries, checking for airway status, adequacy of ventilations (breathing), evidence of cervical spine injury, level of consciousness, circulation and bleeding. Clothing may also be cut away to expose areas of the body for treatment.

5–Identify the Chief Complaint. Specific questions are now asked to determine symptoms that may not be readily obvious.

6–Taking vital signs. Pulse, respirations, blood pressure, skin temperature, and skin color are recorded.

7–Spotting Medical Information Devices. Important medical information may come from a medic alert bracelet or necklace.

8–Conducting a neurological exam. Level of consciousness, motor functions, sensory functions. At this point, a patient's trauma score is often calculated. The score is simply a rating of trauma severity and helps to identify victims who need immediate transport and to determine the appropriate facility for transport to.

9–Taking a history. Scene assessment, symptoms, allergies, medications, previous illnesses, last meal, events prior to emergency.

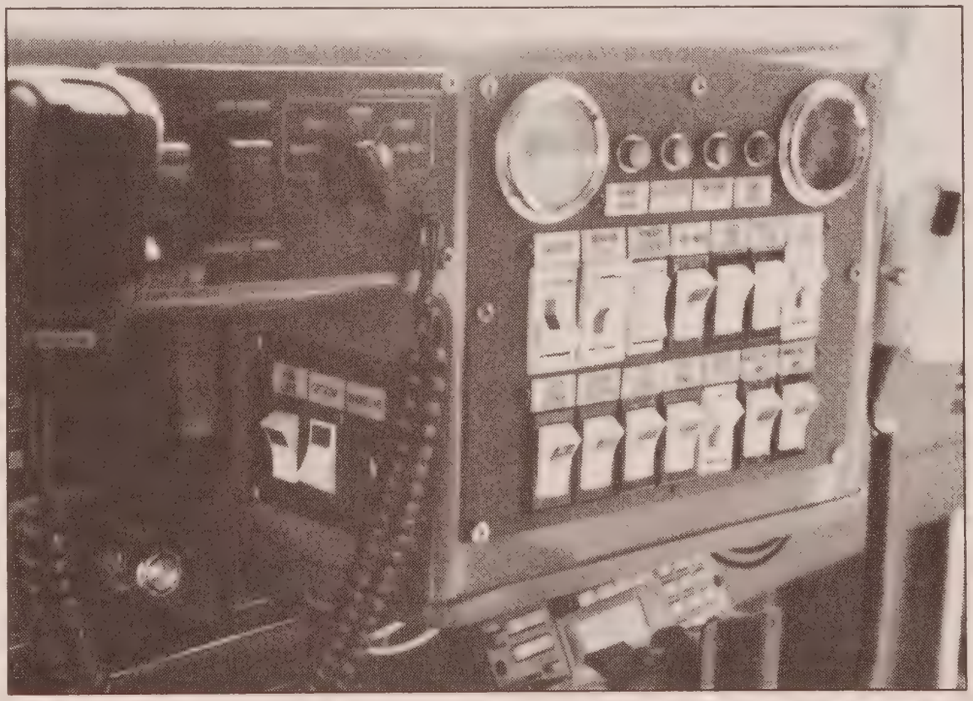
10–Secondary Survey. Once life-threatening injuries have been identified and attended, a secondary survey is conducted to identify swelling, depression, deformity, bleeding, discolorations, penetrations, unusual breathing sounds, unusual odors, etc. The Secondary may be performed at the scene or postponed until the patient is in the ambulance and being transported.

Enroute

From call-out to scene arrival to transport, the EMS system is generally invisible to the scanner listener. Once the ambulance goes enroute to the hospital, however, communications are vital.

The goal of Emergency Medical Services is to stabilize a patient and deliver him to hospital personnel as quickly as possible. Once the patient has been stabilized at the scene, he is loaded into the ambulance and secured for transport. Patient condition determines whether the transport is a Code-3 run with lights and siren, or a non-emergency transport. As soon as practical after leaving the scene, EMTs will contact the hospital. There is one exception to this; often, in the case of a serious injury or multiple victims where advisories, advice or therapy

Continued on page 11



Lots Of Buttons *Photo by Laura Quarantiello*

TABLE 2, EMERGENCY MEDICAL TERMINOLOGY

ACIDOSIS–An abnormal condition in which the body's pH level falls below 7.35, usually caused by excessive amounts of carbon dioxide, lactic or organic acids.

ACLS–Advanced Cardiac Life Support

ACUTE–Having a rapid onset, severe symptoms, and a short duration.

AIRWAY–The route for passage of air and gases into and out of the lungs.

AMBULATORY–Able to walk.

ANAPHYLACTIC SHOCK–Severe allergic reaction which results in bronchial spasms and vascular collapse.

ANGINA PECTORIS–Often referred to as angina, a spasmodic pain in the chest associated with insufficient blood supply to the heart.

ANOXIA–Lacking oxygen.

ANTERIOR–In front of, or in the forward part of. Refers to the ventral or belly surface of the body.

APICAL PULSE–Pulse taken from the apex of the heart by placing a stethoscope under the left breast.

APNEA–Absence of respiration.

ASPIRATION–To inhale materials into the lungs.

ASYSTOLE–Lack of electric or muscular activity in the heart.

AUSCULTATE–To listen.

AV NODE–Atrioventricular node of the heart.

BACKBOARD–Hard board used to keep a patient immobile and reduce the chance of aggravating neck or back injuries. Also called a spine board.

BLS–Basic Life Support. Often refers to an ambulance manned by EMT's.

BETADINE–Antiseptic ointment.

BRACHIAL ARTERY–Artery of the arm.

BRADYCARDIA–Very slow heartbeat.

BUTTERFLY STRIPS–Strips of adhesive used to hold the edges of a wound together.

CANNULA–Any kind of tube inserted into a body cavity, but most often used to refer to the nasal cannula, which supplies oxygen.

CAPILLARY REFILL–A test to assess the adequacy of circulation by depressing the fingernail bed until it turns while, releasing it and noting the time required for color to return.

CARDIAC ARREST–The sudden cessation of heart functions.

CARDIOPULMONARY ARREST–Cessation of both heartbeat and respirations.

CAROTID ARTERY–Main artery of the neck.

CATHETER–A tube for withdrawing or infusing fluids into the body.

CEREBROVASCULAR ACCIDENT–A stroke, also called CVA.

CERVICAL COLLAR–A device used to immobilize the neck.

CHIEF COMPLAINT–The patient's main problem, for which he/she has sought help.

CRAMS–A scoring system for determining level of trauma and probability of survival. Stands for Circulation, Respiration, Abdomen, Motor and Speech.

CREPITUS–A grating sound heard when two bones rub together, as in a fracture.

CYANOSIS–Blueness of the skin due to insufficient oxygen.

D5W–5% dextrose solution used in IV therapy.

D10W–10% dextrose solution used in IV therapy.

DEFIBRILLATION–Application of DC electrical shock to the heart.

DERMAL–Pertaining to the skin.

DEXTRAN–A water-soluble polysaccharide used as a synthetic plasma volume expander in IV's.

DIAPHORESIS–Sweating.

DIASTOLIC PRESSURE–The lower of the two numbers in a blood pressure reading, indicating the resting period between heartbeats.

DILATE–To expand or enlarge.

DISTAL–Farthest from the point of reference.

DORSAL–Of, toward, in, on or near the back.

DORSALIS PEDIS ARTERY–An artery located at the top back of the foot.

DYSPNEA–Difficulty breathing.

ECCHYMOSIS–Blood under the skin; a bruise.

ELECTROCARDIOGRAM–ECG or EKG; a graphic tracing of the electrical currents generated by the heart.

EMBOLISM–Blockage of an artery or vein.

EMESIS–Vomit.

EMS–Emergency Medical Services

EMT–Emergency Medical Technician

ENDOTRACHEAL INTUBATION–A method of intubating in which a tube is passed through the patient's mouth or nose and directly into the trachea in order to open and maintain an airway.

EPINEPHRINE–Adrenalin, used in the treatment of asthma, anaphylaxis, asystole and ventricular fibrillation.

EXTRICATION–Removal from entrapment.

FEMORAL ARTERY–Primary artery of the thigh.

FIBRILLATION–Uncoordinated contractions of the heart.

FLACCID–Limp or soft.

FLUID THERAPY–Replacement of lost body fluids through intravenous bag.

GLUCOSE–Sugar.

HEMATOMA–Localized collection of blood in the tissues resulting from an injury.

HEMOTHORAX–A collection of blood in the chest cavity.

HISTORY–Information about the patient, including chief complaint, incidents leading up to the episode, previous illnesses, etc.

HYDRATION–Infusing water.

HYPERTENSION–High blood pressure.

ICU–Intensive Care Unit.

INFARCTION–Localized tissue death resulting from discontinuation of blood supply; usually used to refer to a heart attack.

INGESTION–The taking in of food or other substances.

INHALATION–The drawing of air into the lungs, also called inspiration.

INTRAVENOUS–Within or into a vein.

INTUBATION–Placement of a tube into the airway.

LACERATION–A wound resulting from tearing or cutting of body tissues.

LACTATED RINGER'S–Sterile intravenous solution containing sodium, potassium, calcium and chloride ions.

LATERAL–Of or toward the side.

LAVAGE–Washing out of a hollow organ, such as the stomach.

LETHARGY–Lack of energy, drowsiness, indifference.

L.O.C.–Loss of Consciousness, also Level of Consciousness.

MANDIBLE–Lower jawbone.

MAST–Military Anti-Shock Trousers, used to maintain blood pressure.

MAXILLA–Upper jawbone.

METACARPALS–Bones of the hand.

MIDLINE–The median line or plane of the body.

NORMAL SALINE (NS)–An intravenous solution containing 0.9 percent sodium chloride in water, used for volume replacement of fluids.

O2–Oxygen.

ORBIT–The bony structure surrounding the eyeball.

PALPATE–To feel by hand; also palpation.

PARTIAL REBREATHER–A plastic face mask equipped with a reservoir bag to permit the patient to rebreathe 1/3 of his expired air.

PLASMA–The fluid portion of blood.

PNEUMOTHORAX–An accumulation of air in the lung cavity, usually resulting from a punctured lung or other chest injury.

POSTERIOR–Situated at the back.

PRIMARY SURVEY–The first overview of a patient, designed to find the chief complaint and assure that heartbeat and respiration are present.

RADIAL PULSE–Pulse taken at the base of the thumb (also known as the Radial Site.)

REACTIVE–To respond.

RESPIRATION–The act of breathing.

RESPONSIVE–Acting or moving upon stimulation.

RUN SHEET–A written record of each call which is maintained by EMT's or paramedics and includes such information as date and time of run, names of EMT's/Paramedics, time of departure from quarters, arrival at scene and location of the scene, all information concerning the scene, patient and treatment rendered, time departure from scene, destination, time of arrival, etc.

SALINE–Containing salt.

SCBA'S–Self Contained Breathing Apparatus.

SYSTOLIC–The highest peak pressure exerted on the arterial walls of the heart; the higher of the two numbers used to denote blood pressure.

TACHYCARDIA–Abnormally rapid heartbeat.

TKO–To Keep Open.

VASCULAR–Relating to the blood vessels.

orders are needed, EMTs will contact the hospital while still on scene. Always keep listening to your scanner, as you never know when or if this will occur.

The normal enroute call to the hospital emergency room's radio nurse relays the following information: Ambulance identification (call sign); brief description of the situation; chief complaint; vital signs; emergency care currently being rendered; and estimated time of arrival. The radio nurse, who may consult with the ER physician on duty, will ask for any needed information and instruct the EMTs to perform certain treatment. The EMTs may be given a run number for their records, and a room or bed assignment for the patient.

E.R. Arrival

Upon arrival at the emergency room doors, the EMS team advises the dispatcher of arrival by radio and hands off the patient to the nurses and physicians by giving a verbal report and providing them with any pertinent written records. Once this is done, unless their assistance is needed by the ER personnel, the EMS crew's job is essentially finished. After replenishing ambulance rig supplies, if needed, the crew will call back in service and await the next dispatch.

Radio Frequencies

The EMS system relies heavily on voice radio communications to function and this is of great benefit to the scanner listener. Emergency medical communications are found within a few fairly specific bands of frequencies, most all of which are common on even entry-level scanners: 150.8 to 156 MHz, 463 to 464 MHz, 468 to 469 MHz and, to a limited extent, 800 MHz.

Dispatching of EMS calls may occur on local fire department frequencies (in the fire radio service bands), dedicated city & county EMS frequencies (EMS bands) or private ambulance service frequencies (in the EMS bands or business bands). To find out which is common in your area, simply use the process of elimination. Listen for EMS calls on fire dispatch first, then try the others. A good frequency book will direct you to the active freqs in your region.

Radio calls from the ambulance to the hospital giving patient status and treatment information are by far the most interesting to monitor. They can be found on frequencies within the 150 MHz band and on eight specific pairs of frequencies in the 463 to 468 MHz band (see Table 1).

To a limited extent, 800 MHz frequencies are seeing use by private ambulances services, as well as trunked fire & EMS systems. If your local fire department is on an 800-MHz system, EMS dispatches will likely occur here. It's not uncommon to hear ambulance-to-hospital communications on these frequencies as well. Private services may use an 800 MHz business allocation in repeater mode or as part of an SMR (Specialized Mobile Radio) trunked system. Allocations in the 150 to 151 MHz band have been made for emergency medical services, though their actual use has not been definitively reported yet by monitors. Additionally, most ambulance rigs carry cellular phones and have been known to contact the hospital via this method. If you're not hearing any ambulance-to-hospital calls when you know there should be some, be sure to check the cellular band.

In Service

There is nothing quite like monitoring a Code-3 run by paramedics struggling to save a life. On the Richter scale of scanner monitoring, it registers as high as the needle will go. For a candid look behind the siren to the real drama, tune in emergency medical services.

USSN

Table 1

EMS Frequency Pairs (Base/Mobile)

MED-1	463.000 / 468.000
MED-2	463.025 / 468.025
MED-3	463.050 / 468.050
MED-4	463.075 / 468.075
MED-5	463.100 / 468.100
MED-6	463.125 / 468.125
MED-7	463.150 / 468.125
MED-8	463.175 / 463.175
MED-9	462.950 / 467.950 Disp.
MED-10	462.975 / 467.975 Disp.

Check These Bands

47.4200 to 47.6600
45.9200 to 46.0400
150.7750 to 150.7900
155.1600 to 155.4000
220.9025 to 220.9225
453.0250 to 453.1750
462.9375 to 463.1875, as above
855.0125 to 860.9875

High Tech. Lifesaver *Photo by Laura Quarantiello*

Feature Story

Signals

Radio Waves are Everywhere

Identify and monitor the signals around you. From the mall security to GMRS, here's how.

by Ed Hesse, WB2RVA

Have you ever walked into a store and, noticing the security people speaking into hand-held radios, wondered what they were saying? Have you observed employees of, say, a motel you're staying at talking on their radios and wondered what was going on? When you were at your daughter's graduation, wondering what was holding up the ceremonies and seeing faculty members talking into hand-held radios in an agitated way? Have you ever been stalled by highway construction work and wondered what was slowing everything down? Finally, have you ever been at a pro-ball game and wondered what the teams and stadium's staffs were discussing?

Wouldn't it have been nice if you could have turned to your ever-present portable scanner, pushed a button or two, and found out immediately just what going on! Why be in the dark in such situations when relief could be just moments away? A little bit of knowledge can be very helpful, so read on and see how you can monitor what all those people are talking about on their radios.

First - Look For The Color

Perhaps the title of this article should have been "by their colors you shall know them." That's one of the fascinating things about some of the portable two-way radios used by many businesses and organizations. One look and you immediately know what frequency the unit is operating on. For example, when I go into the local Price Club, I know that its employees are talking on 154.600 MHz. How do I know? Each of their hand-held radios has a "green dot" on it. And when a unit has a green dot on it, its frequency has to be 154.600 MHz.

It wasn't always so. Before the color-coding system became popular, knowing the frequency of a radio wasn't that easy. A business owner would go into a store and buy two units (each with the same frequency in them). They would work well in the business but what happened when a unit was dropped and broken? The business owner went back to the store and bought "another unit." But buying a two-way radio is different from buying, say, a drill or a computer. Radios may look the same, but the frequencies vary. How would the purchaser know that he was getting the same operating frequency? He wouldn't, and when the second unit was put into use in his operation, he found "it didn't work." Of course not; Jack was talking on frequency "A," and Mary was talking on frequency "B." Back went the new unit to the store, and the business owner became disenchanted with business radio.

To remedy situations like this, the manufacturers came up with a simple system; let's color code the units operating on certain common Business Radio Service channels by frequency. If you break your green-dot radio, go to the store and buy another green-dot radio. If you lose your "blue star" radio, buy another blue-star unit. Can't beat that for simplicity, can you? By the way, the blue dot frequency is 154.570 MHz (Table "A" shows the frequencies for the various colors of dots and stars). Once you know the color (dot or star), you know the frequency they are talking on.

Easy Radio To Buy

As you become aware of color coding, you will also see that anybody can buy these radios. For example, you can go to your local Radio Shack and buy a "VHF business transceiver" which operates on both the green and blue dot frequencies. Organizations that use the units include businesses, schools, churches, clinics, motels, and so forth. Generally, organizations where many units will be used in the same location. As table "A" shows, some of these frequencies can be used by itinerants, those who use them away from a central location.

An FCC license is required to use these radios, but no test is needed. Even though a license form will be found in the box in which the radio comes, how many buyers will complete the form and send it to the FCC? If the buyer doesn't follow through with the paperwork, his radio usage won't be found in the data bases of the federal government (or in the frequency listings sold to scanner monitors). That is where the challenge of monitoring these units comes in. Not only are they low-powered (two watts), "looking up" the frequency is not that easy. You have to get close enough to see the "color" on the radio (or have all the colors in your hand-held scanner). If you know where to look, you will hear many interesting transmissions. Do not overlook those family groups that use these radios to keep in touch in parks, at the beach, and so on.

There is another way to find the frequencies. A friend of mine, Bob, is a "frequency seeker," that is, he looks for

frequencies to monitor. He doesn't look in books, he looks "in the air." Bob uses the "Scout," which is a frequency counter made by Optoelectronics that literally captures signals of local transmitters and displays the frequency on the unit's read-out display. Once Bob sees the frequency, he enters it into his scanner and listens to the actual transmission.

Few Radios Seem To Be Licensed

One evening recently, he took the Scout to a local mall to find more frequencies. He says, "I seem to be finding a lot of frequencies being used that are not listed in the FCC data base and therefore not in Scanner Master or Police Call. I recently went to the mall and logged over 50 frequencies. Only four or five were actually verified in the FCC data base!"

The moral of the story: Look for the colors of the radios and use the frequencies given in this article's tables. This is the fastest way to monitor what is going on.

As already noted, many of the radios you will be monitoring have two watts of output and, depending on terrain, you may be able to hear them from one to two miles away. It is important to have a good antenna on your scanner, not just the "rubber ducky" that many of them come with. As a rule of thumb, the higher the frequency, the shorter the antenna needed. The lower the frequency, the longer the antenna.

Some of the units have a CTCSS (PL) feature which, in effect, permits the user to hear only calls intended for him. That is why the Incredible Universe store, a quarter of a mile south of the local Price Club, is also using a green dot radio in its parking lot. Of course, you'll be able to hear all transmissions on that frequency since your scanner won't be blocking them out (as the CTCSS would do).

Traveling Radios

There is another group of radio frequencies, commonly known as "Business radio," that offer interesting listening. Generally speaking, business radio involves the use of radio by businesses, educational institutions, hospitals, sports teams, and so forth. It also involves "itinerants" using the units away from a central location. (See table "B" for common "business" frequencies. The most popular itinerant frequency is said to be 151.625 MHz (the red dot).

Business radios offer a wide variety of listening opportunities. For example, I can attend the NFL games of the Jets and Giants in the New York area and hear their transmissions by tuning, say, 151.625 and 154.540 MHz. Similar frequencies are used by the NFL throughout the United States. The printed frequency directories come in handy here, since larger businesses do tend to file for licenses, and you can look up their frequencies easily.

Table A

154.570	Blue Dot
154.600	Green Dot
151.625	Red Dot (I)
151.955	Purple Dot
462.625	Black Dot
462.675	Orange Dot
462.575	White Dot
464.500	Brown Dot (I)
464.550	Yellow Dot (I)
467.850	Silver Star
467.875	Gold Star
467.900	Red Star
467.925	Blue Star

(I - Itinerent use)

Table B

151.655	151.955
154.515	154.570
461.000	462.175
463.200	464.9875
467.750	467.925
460.650	469.975

Table C

462.550(+5)
462.5625
462.575(+5)
462.5875
462.600(+5)
462.6125
462.6250(+5)
462.6375
462.650(+5)
462.6625
462.675(+5) (E)
462.6875
462.700(+5)
462.7125
462.7250(+5)

(+5) = Input is 5MHz higher
(E) = Emergency purposes only.

Don't Overlook GMRS

And then there are the GMRS (General Mobile Radio Service) frequencies, sometimes known as the "FM Citizens Band." These frequencies (see table "C") are set aside for "personal and family use" with the exception of 462.675 MHz, which is for emergencies and assistance to travelers. Business or commercial enterprises are excluded from these frequencies, and you never know what you will encounter when you monitor them; non-profit groups, volunteers, hunters, picnickers, or an individual in distress. Color coding also applies to some of the GMRS frequencies and all you have to do is look to find out what the transmitting frequency is. Again, once you list the GMRS frequencies in your scanner, you can zero in quickly on GMRS transmissions.

Since some users of these frequencies have set up repeaters, your chances of hearing GMRS signals are even greater. When a repeater is used, the input frequency is exactly 5 MHz higher than the output frequency. For example, if you are listening to a mobile unit on 462.550 MHz, the transmitting station is operating (inputing) on 467.550 MHz. You can get a good idea of how close the mobile is to you by monitoring the input frequency (as well as the output frequency).

The GMRS "colors" are 462.575 (white dot), 462.625 (black dot) and 462.675 MHz (orange dot).

Your Game Plan

Now that you know where to listen, enter the frequencies shown in this article in your scanner. Put them in banks. One bank for the business radios, one for the GMRS, the itinerants, and so forth. You will now have a scanner with many of the most popular frequencies in America loaded into it! No matter where you go, you will be able to tune in to much of the local action, merely by looking at the colors on the radios or by making a judgment based on the situation you are in. Log what you hear. Confirmed frequencies are the most valuable. And when you see that store security guard hold his radio up to his mouth, you will be able to hear him say, "Hey, check out that dude with the scanner who just walked in. **USSN**

Government

United States Department of Justice

U.S. Drug Enforcement Administration

The D.E.A is the governments premier law enforcement agency in dealing with illegal drugs.

by Roger Cravens

The Drug Enforcement Administration (D.E.A.) is the U.S. Government's premier law enforcement agency in dealing with illegal drugs and drug interdiction. It has also been my favorite government agency to monitor for as long as I've had a scanner. In my opinion, the men and women of D.E.A. put their lives on the line daily to help keep illegal drugs off the street.

Unfortunately, with their sophistication and the exceptional amounts of profit (often running into the billions of dollars), drug runners are almost as sophisticated as our law enforcement agency! I was recently told by a U.S. Army Special Security employee that he has seen reports of drug runners using submarines to load and offload their illegal cargo of cocaine. Smugglers' aircraft are state of the-art, as are their methods of sensitive communications. They have access to most state-of-the-art digital radios, including units that can scramble digital signals. The more I checked into the D.E.A., the more impressed I was with the job they do to confront such sophisticated criminals. If you've never listened to these front line, anti-drug soldiers, you'll gain a totally new respect for the job they do once you've listened in on these civil servants.

The D.E.A. was created in July, 1973 by Reorganization Plan Number 2 of 1973 (Title 5 USC), which merged four separate drug law enforcement agencies. DEA's overall and general responsibilities include:

1. Long term immobilization of major trafficking organizations through the removal of leaders and assets upon which these organizations depend
2. Investigation of major narcotic violators who operate at interstate and international levels
3. Enforcement of regulations governing the legal manufacturing, distributing, and dispensing of controlled substances
4. Management of a national narcotics intelligence system
5. Coordination with federal, state, and local law enforcement authorities and cooperation with counterpart agencies abroad (including Interpol)
6. Training, scientific research, and information exchange in support of drug prevention and control

The Department of Justice manages the El Paso Intelligence Center (EPIC) located at Building 11339, SSG Sims Street, Biggs Army Air Airfield, Fort Bliss (El Paso), Texas 79918-5100. EPIC is a 24-hour tactical and strategic drug intelligence center that includes nine other federal agencies in all 50 states. D.E.A. concentrates its efforts on high-level narcotics smuggling and distribution organizations in the United States and abroad. The D.E.A. works closely with other federal agencies, including the Customs Service, Internal Revenue Service, U.S. Coast Guard, U.S. Navy, U.S. Army, Federal Bureau of Investigation and two that I found most interesting the Central Intelligence Agency and the National Security Agency. It also chairs the 11-agency National Narcotics Intelligence Consumers' Committee which develops an annual report on drug production, trafficking, and other abuse trends.

Nearly 300 administrative compliance investigators enforce implementation of the legal manufacturing and distribution of prescription drugs. They also maintain an active training program for narcotics officers in other federal, state, and local agencies, including foreign police agencies such as Interpol and Scotland Yard.

The D.E.A. is divided into the following main operational divisions: Human Resources Division; Intelligence Division; Office of the Chief Financial Advisor; Operations Division; Operational Support Division; and Planning and Inspection Division.

The main enforcement field offices and divisions are located in Atlanta,

Boston, Chicago, Dallas, Denver, Detroit, Houston, Los Angeles, Miami, Newark, New Orleans, New York, Philadelphia, Phoenix, San Diego, San Francisco, Seattle, St. Louis, and Washington DC. The central Aviation section is located at Fort Worth, TX. Their foreign offices are too numerous to list in this article, but the list reads like an international road map from Bonn, Germany to Lima, Peru to Vienna, Austria. All main international offices and agents are associated with the U.S. Embassy or Consulate's office, similar to how the C.I.A. conducts clandestine operations.

In 1992, 920,000 total arrests and convictions were made for violations of U.S. drug laws; 546,000 were white, 365,000 were black, and 9,000 were listed under the heading of "other" according to the Statistical Abstract of the United States, 1994 edition.

The amount of money spent on treatment of drug abuse is staggering, and the success rate from these treatment facilities is limited. As an example, cocaine-related emergency room episodes for all ages, race, and sex:

1985	28,801
1986	51,636
1987	91,596
1988	101,578
1989	110,013
1990	80,355
1991	101,189
1992	119,843
1993	123,317

(Data from table 68, page 161, United States Health, dated 1994, U.S. Department of Health and Human Services)

Before I get into actual frequencies used by the D.E.A., let me advise you that although I am in possession of frequencies for body microphones and "wires" for my area, I will not list them in this column. I will say that the overwhelming majority of equipment the D.E.A. uses for undercover operations is manufactured by Audio Intelligence Devices, Fort Lauderdale, Florida. Most undercover agencies, from your local county to large city and federal agencies, use equipment from Audio Intelligence Devices. The frequencies are changed often so that by the time this publication hits the street, they might just be useless. These devices have limited range, so you'll just have to search.

I would suggest, if you are interested, that you search between 150 and 174 MHz (primarily 170 MHz thru 174 MHz). This is where you will find undercover operations (by both local undercover drug agents and the D.E.A.). The D.E.A. have also been known to use 215 to 220 MHz, but it is extremely unusual because of the antenna length and the range of the signal being monitored. Depending on which agency you are dealing with, the body-wire could be hidden and taped to the agent's body or, like my local county undercover agents, a transmitter that looks like a beeper worn on the belt. The broadcast distance could be from many hundreds of feet to a mile. Searching for these types of bugs could be a full time job for the scanner enthusiast interested in this specific type of signal target-at least it has been for me. I consider it the most exciting listening you could tune in to.

In Atlanta, the D.E.A. evidently has an internal policy to keep quiet from a public and media perspective. You never hear about their busts or investigations. What actually occurs is the time, legwork, and arrests are conducted by the D.E.A., but credit is given to local authorities. I have listened to many ongoing investigations and daytime drug busts, but when I finally heard about it from the media, the local law enforcement authorities got the credit-D.E.A.'s involvement is never mentioned.

Please be aware that not all of the frequencies listed here will be active in your area. There will generally be at least three and as many as 15 active in any one area. As a suggestion, if you have a computer, input and print out the master list in this article, then enter them into your scanner. As you note activity over a 30 to 60 day period, highlight that frequency. After 60 days, you should have a good idea which frequencies have been assigned for your area by the National Telecommunications and Information Administration (NTIA), which is responsible for assignment of all federal frequencies. It is also important to point out that channel numbers listed have been uniform throughout the states that I have traveled. But depending on the missions and desires of the local office, these channel numbers may not be the same in your area.

The D.E.A. may also grab a previously unused frequency for temporary, one-time operational use. Once the operation is completed, the frequency is released. While you are listening to the frequencies, I would also check the 406 thru 420 MHz range for additional activity and note what is being said for future reference. That frequency could come in handy and should be checked from time to time for activity. If you happen to live along the coasts or very large metropolitan cities, activity should be fairly intense.

In conjunction with the D.E.A., there are also High Intensity Drug Trafficking Area teams. I haven't been able to confirm frequencies for these teams so they are not listed here. These special teams work the very largest cities. So far, in the Atlanta area, I've not heard activity from these special teams. Based on the amount of drugs flowing north from the gulf coast and Florida, this has been rather a surprise to me. But I continue to monitor these frequencies on a quarterly basis just to see if they have something occurring in the Atlanta metro areas-so far, nothing.

The D.E.A. also uses the HF frequencies below 30 MHz, but they will not be furnished with this article unless there is a demand for them.

The one Department of Justice agency I have not been able to investigate in terms of frequencies is the National Drug Intelligence Center. They are in Johnstown, PA and McLean, VA. This agency is broken down into the following sections: Director; Legal Counsel; Special Security Programs; Deputy Director (Administrative Services); Administrative Branch;

Drug Enforcement Administration - Atlanta
(PL TONE 156.7/KLR 731)

OUTPUT	REPEATER INPUT	CHAN	GENERAL DESC. OF USE
171.4500			D.E.A. CHOPPER (HANGER AT PEACHTREE DEKALB AIRPORT)
409.8750			WIRELESS MICROPHONE (S)
410.8750			WIRELESS MICROPHONE (S)
418.6250	416.0500	01	TASK or STRIKE FORCE
418.6750	418.6750	04	TASK or STRIKE FORCE TACTICAL(S)
418.7500	418.7500	03	TASK or STRIKE FORCE TACTICAL(S)
418.8250	415.6000	05	TASK or STRIKE FORCE
418.9000	416.3250	02	TASK or STRIKE FORCE
418.9500	416.2000	06	TASK or STRIKE FORCE
418.9750		07	TASK or STRIKE FORCE (S)
418.9750	417.0250	07	TASK or STRIKE FORCE TACTICAL

Frequencies Used by the Drug Enforcement Agency
(PL TONE 156.7)

OUTPUT	INPUT	CHAN	GENERAL DESC. OF USE
123.7750			DRUG TASK FORCE - VICTOR
133.2000			DRUG TASK FORCE - VICTOR 2
134.4000			DRUG TASK FORCE - VICTOR 4
135.5000			DRUG TASK FORCE - VICTOR 5
165.2875			DEA FIELD OFFICES
171.4500			VARIOUS USES (Local Asign.)
171.6500			VARIOUS USES (Local Asign.)
172.0000			VARIOUS USES (Local Asign.)
172.0500			VARIOUS USES (Local Asign.)
172.1000			VARIOUS USES (Local Asign.)
172.2000			VARIOUS USES (Local Asign.)
172.3000			VARIOUS USES (Local Asign.)
353.9000		03	DRUG TASK FORCE - UNIFORM
416.2500			JOINT TASK FORCES (S)
416.3750			SPECIAL OPERATION TEAMS (S)
416.4000			SPECIAL OPERATION TEAMS (S)
417.7500	413.9750	09	TASK/TACTICAL FIELD OPERATIONS
417.7500			SPECIAL OPERATION TEAMS (S)
418.0500			INTERAGENCY COORDINATION (S)
418.1750			INTERAGENCY COORDINATION (S)
418.2000			INTERAGENCY COORDINATION (S)
418.2250			INTERAGENCY COORDINATION (S)
418.5000			VARIOUS USES (Local Asign.)(S)
418.5750			VARIOUS USES (Local Asign.)(S)
418.6250	416.0500	01	OPERATIONS/CONTROL
418.6500			INTERAGENCY COORDINATION (S)
418.6750		04	SPECIAL OPERATION TEAMS (S)
418.7000			SPECIAL OPERATION TEAMS (S)
418.7250			SPECIAL OPERATION TEAMS (S)
418.7500		03	CAR-TO-CAR & HANDI-TALKIES (S)
418.7750	416.3750		JOINT TASK FORCE (SPECIAL OPER
418.8000			SPECIAL OPERATION TEAMS (S)
418.8250	415.6000	05	TASK/TACTICAL FIELD OPER
418.8750			SPECIAL OPERATION TEAMS (S)
418.9000	416.3250	02	SPECIAL OPERATION TEAMS (S)
418.9250			JOINT TASK FORCE (SPCL OPER)
418.9500	416.2000	06	TASK/TACTICAL FIELD OPER
418.9750			CAR-TO-CAR & HANDI-TALKIES (S)
418.9750		08	JOINT TASK FORCE (SPCL OPER.)
418.9750	417.0250	07	JOINT TASK FORCE (SPCL OPER.)
419.0000	417.4000		JOINT TASK FORCE (SPCL OPER.)
419.2000	414.6000		TASK/TACTICAL FIELD OPER.
419.2250	413.9750		TASK/TACTICAL FIELD OPER.
419.2500	411.1250		TASK/TACTICAL FIELD OPER.
419.2750	414.4250		TASK/TACTICAL FIELD OPER.
419.3000	414.5250		TASK/TACTICAL FIELD OPER.

In Atlanta, the above frequencies are quite active and current as of January 15, 1995

Budget and Finance; Liaison Branch; Information Resource Management; Deputy Director, Operations (Strategic Intelligence Branch-A; Strategic Intelligence Branch-B; Strategic Intelligence Branch-C); Document Exploitation Branch; Intelligence Collection Branch; Deputy Director, Technical Support; and Systems Technology Branch.

If anyone has information on this agency's frequencies, please write in care of U.S. Scanner News and pass on whatever you have to me. I would appreciate any assistance you may render for this request.

I have worked for several years collecting this information. It was very difficult to assemble and confirm. I want to thank the many people across the country who assisted me in confirming these frequencies. They are too numerous to mention here and many would not want their name printed. Just the same, many thanks to you. Some frequencies and information on the D.E.A. only came to my attention very recently. Except for frequencies and information that I have not been able to personally confirm, the information here is a complete representation and listing. I use the Atlanta listing on a daily basis, and have found many, many hours of enjoyment and pleasure out of hearing the good guys do their best to put behind bars those who would enslave this nation and our most important resource-our children-by the addiction to drugs. If you know someone dealing drugs, drop a quarter and save a life. **USSN**

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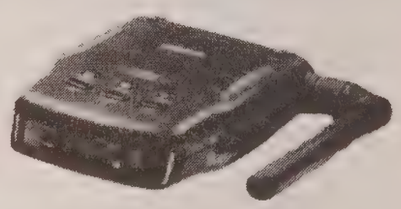

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Transportation

Oklahoma City, Oklahoma Area

Tinker Air Force Base is one of the worlds largest air depots and home of the Federal Aviation Administration Aeronautical Center.

by Roger West

The State of Oklahoma is located near the central part of the conterminous United States, and ranks 18th among the states in size. It is bordered by Kansas and Colorado on the North, by New Mexico on the West, by Texas on the West and South, and by Missouri and Arkansas on the East.

Formed by the union of Oklahoma Territory and the Indian Territories, Oklahoma was admitted as the 46th state on November 16, 1907. Oklahoma is a Choctaw word meaning "red man." Oklahoma has been nicknamed the "Sooner State" for the settlers who tried to enter the area and claim land sooner than it was legal to do so. The state is an important producer of agricultural products, especially wheat, cattle, cotton, and mineral fuels, notably petroleum products and coal.

Petroleum was first obtained from a well in 1859 and since 1896 Oklahoma has been a leading petroleum-producing state. Large coal reserves are located in Eastern Oklahoma. Glass sand, salt, gypsum, lead, copper, limestone, dolomite, and granite are also found in great quantities. Much of Oklahoma's abundant hydroelectric power potential has been harnessed since World War II. The fertile plains are covered with wheat farms and cattle ranches. The Sooner State's forests in the Ouachita Mountains are densely forested with pine, oak and hickory, plus some cypress grows in the valleys of the Mountain Fork and Little rivers. Pine tree farming, now the dominant, regulated land use in the mountains, supplies a large paper mill in Valliant. Sawmills are common throughout both the Ouachita and Ozark regions.

Because Oklahoma is a part of the "Sun Belt"and has a favorable tax structure, an adequate supply of energy and a capable work force, several large industries have relocated to the state. Manufacturing is highly diversified. Leading industries in Oklahoma include the manufacture of petroleum and coal products, non-electrical machinery, food products, fabricated metal products and rubber and plastics products. The chief manufacturing area lies in a belt from Oklahoma City Northeast to the Kansas-Missouri-Oklahoma border.

Railroads, first built in Oklahoma in the 1870's, were an important factor in the state's development. Extensive road and highway networks, however, have increasingly supplanted railroads for freight transport as well as passenger travel. The McClellan-Kerr Arkansas River Navigation System links the Tulsa area with the Mississippi River and thus the Gulf of Mexico.

Oklahoma City is the capital and largest city of Oklahoma. It is located in the central part of the state on the North Canadian River, and is the county seat of Oklahoma County.

The city straddles a major oil field, with rows of derricks marking its skyline. Aviation, centered at the nearby Tinker Air Force Base (one of the world's largest air depots) and the Federal Aviation Administration Aeronautical Center, is the major economic sector. Oklahoma City is also the processing and shipping hub for the state's livestock and grain products. Manufactures include drilling and electronic equipment, computers, and steel.

The city has more than 70 municipal parks and is the site of Oklahoma City University. Cultural features include a symphony, several theater companies, and the Oklahoma Art Center. The city is proud of its Western heritage, displayed at the National Cowboy Hall of Fame, Western Heritage Center, and the state historical museum.

Enid, which is located in North Central Oklahoma, is the seat of Garfield County and an important distribution and processing center for wheat, cattle, poultry, and oil. Philips University is located in Enid, and Vance Air Force Base is nearby. Once a watering place on the Chisholm Trail, the town was settled very quickly in 1893, when the Cherokee Strip was opened by "runs" of settlers.

Lawton is a city in Southwest Oklahoma, and is the seat of Comanche County. Surrounded by cotton and wheat farms, grazing lands,

and petroleum fields, it is a commercial center with diversified industries. The city is the site of Cameron University, and Fort Sill, the United States Army Field Artillery Center, is nearby

I received a letter from Edward Ashley of Augusta, Georgia in reference to the article I wrote for the December, 1995/January, 1996 issue on the National Weather Service. Ed stated that he enjoyed the article, but that I had failed to mention that the Amateur Radio operators throughout the United States play a vital role when it comes to weather spotting when severe weather is approaching. This was truly an oversight on my part as I am also a Severe Weather Spotter here in Polk County, Wisconsin (PLK401) for the National Weather Service Office in Channhassen, Minnesota. Whenever severe weather is heading our way the first thing I do is program in the local ham net and the Minneapolis, St.Paul, Minnesota ham net to receive information on the approaching severe weather. Yes, I agree, that the Amateur Radio operators play a very important role in severe weather watching! Thanks for pointing out this oversight on my part, Ed!

Ed also enclosed a newspaper article on public safety, which I forwarded on to the Public Safety Communications Editor, Ed Muro.

My next letter comes from Jack McCartan of Newark, Delaware. Jack enclosed some newspaper articles from the Wilmingham, Delaware News Journal. The first article is about Boeing's first Osprey fuselage off the assembly line in Ridley Park, PA. The Osprey fuselage was transferred to Fort Worth, Texas on a C-17 cargo plane for final assembly and flight testing in the Fort Worth and Dallas area. Depending on congressional allocations, Boeing and their partner Bell-Textron of Fort Worth, Texas expect to build at least 523 Ospreys by the year 2020, at an estimated cost of $29.4 million per plane.

The controversial tilt-rotor aircraft which takes off and lands like a helicopter but flies like an airplane, suffered some major setbacks, including two serious accidents, in the last four years.

The Ospey, with a pilot, co-pilot, flight engineer and crew chief, can carry up to 24 combat-loaded troops into battle. The two non-pilots also serve as door gunners. After lifting vertically from a landing zone in its helicopter mode, the twin turboprop rotors are tilted forward, allowing the plane to fly 2,000 miles at 350 mph.

Initial flight testing of the Osprey was done at the New Castle County Airport, Wilmington, Delaware. The test program has since been moved to the Patuxent River Naval Test Center, which is located approximately 60-miles Southeast of Washington, D.C. Military and Boeing-Bell pilots and engineers will jointly test the planes to be delivered to the Marine Corps in 1999.

The other article that Jack sent in was about the annual "Holly Run" to take Christmas greens to Tangier Island, Va., which is located out in the middle of Chesapeake Bay. This is the 28th year in a row that aviators from Delaware, Maryland, peninsular Virginia and other nearby states have made their annual "Holly Run" to the island, which doesn't have any holly trees or greens on it.

The pilots gather at Cambridge-Dorchester Airport, which is located East of Cambridge, Maryland, for a mandatory briefing on departure, arrival, spacing, radio frequencies to be used and how to by-pass the restricted airspace at the Patuxent River Naval Air Test Center. This year the contingent from Delaware will include ten small planes flown by aviation students from Wilmington College, members of the pilots' group Delaware Aviation Support, Inc., and representatives from Wilmington Chapter 240 of the Experimental Aircraft Association.

Just as I was about to copy this issue to disk and send it, I decided to wait for the mailman and to see if anyone else had written. There was a letter from a reader in Illinois, pointing out that I had left out the weather frequency for Paducah, Ky., which is 162.425, and I had listed Louisville, Ky. under the State of Illinois. I wish to thank the reader, who did not indicate whether he wanted his name published for pointing this out to me.

Well, that will wrap things up for another issue of the Transportation Column. Remember, if there is something you would like to see covered or just have some information for me, please write!

73's, Roger

CREDITS:

VHF DOD (Department of Defense) Publication; UHF DOD Publication; Airport and Facility Directories; DOD; Military Training Routes; My data files; FCC data files; Edward Ashley, Augusta, Ga.; Jack McCartan, Newark, De.; Reader in Illinois.

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By Air

(all times shown are CST)

BMC HELIPORT, OKLAHOMA CITY

REMARKS–Unattended.
PILOT ALERTS!! ** Light poles all quadrants as close as 100 feet to helipad!!

CTAF	122.900

CLEARANCE E. PAGE MUNI. AIRPORT, OK CITY

REMARKS- Attended Monday-Saturday 7:30 am– 5:30 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Deer on and in vicinity of airport!!

CTAF/UNICOM	123.000
Appr/Dep	124.600

DOWNTOWN AIRPARK, OKLAHOMA CITY

REMARKS- Attended 6 am - 10 pm.
PILOT ALERTS!! ** Power lines and poles on and in vicinity of airport!!

CTAF/UNICOM	122.800
Clearance	125.400

FAIRGROUND HELIPORT, OKLAHOMA CITY

REMARKS- Attended irregularly.
PILOT ALERTS!! ** 35 foot power lines and poles located 75 feet West of helipad!!
** Traffic enter and depart from the East between marked poles on East side of May Avenue, along drainage ditch running North-Northwest of helipad!!

CTAF	122.900

SUNDANCE AIRPARK, OKLAHOMA CITY

REMARKS- Attended November-February 7 am - 9 pm, and March-October 7 am - 10 pm.

CTAF/UNICOM	122.700
Appr/Dep	124.600
Clearance	123.700

WILEY POST AIRPORT AND HELIPORT, OK CITY

REMARKS- Attended continuously.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Helicopter landing area is not marked!!

CTAF	126.900	
UNICOM	122.950	
ATIS	128.725	
FSS	122.400	255.400
	122.650	
Appr/Dep	124.200	336.400
	120.450	385.500
	126.650	393.100
	124.600	395.000
Tower	126.900	306.900
Ground	121.700	

WILL ROGERS WORLD AIRPORT, OKLAHOMA CITY

[185th TAS; 137th TAW of the OKLAHOMA AIR NATIONAL GUARD; FEDERAL AVIATION ADMINISTRATION AERONAUTICAL CENTER]
AIRFIELD OPERATIONS:
REMARKS- Attended continuously.
Oklahoma Air National Guard hours of operation 6:30 am-5:30 pm Monday-Thursday. Contact "Sooner Operations" on 319.400 when 50 Nautical Miles out.
RESTRICTIONS!! ** Prior permission for parking on Federal Aviation Administration Aeronautical Center Ramp!!

UNICOM	122.950	
ATIS	125.850	
FSS	122.400	255.400
	122.650	
Appr/Dep	126.650	393.100
	124.200	336.400
	120.450	385.500
	124.600	395.000
Tower	119.650	257.800
	120.250	
Ground	121.900	348.600
Clearance	124.350	
Oklahoma Air National Guard Operations and Command Post "Sooner Operations"		319.400
GROUND OPERATIONS:		
Security	163.4875	
Fire Department/Crash		
Crews/Trucks	149.525	
Misc	148.500	
	150.150	
Federal Aviation Admin.	162.250	
(KIA 21)	164.050	
	165.5375	
	165.6125	
	169.250	
	169.3125	

TINKER AIR FORCE BASE,OK CITY

[2854th AIR BASE GROUP; 28th AIR DIVISION; 552nd AIR CONTROL WING; 3rd COMBAT COMMUNICATIONS GROUP; STRATEGIC COMMUNICATIONS
WING #1; COMMUNICATIONS SYSTEMS CENTER; 465th FIGHTER SQUADRON
and the 507th FIGHTER GROUP of the AIR FORCE RESERVE; AIR-LOGISTICS CENTER; AIR COMBAT COMMAND CENTER]
AIRFIELD OPERATIONS:
REMARKS- Attended continuously.
RESTRICTIONS!! ** Official Business Only!!
PILOT ALERTS!! ** Noise abatement area!!
** Expect heavy bird activity on or in vicinity of airfield from 6:01 pm - 8 pm October-February!!
** Inbound aircraft with VIP's aboard contact "Base Operations" on 165.6875 or 408.800 when 30 Minutes out!!

SFA		392.100
PTD	134.975	372.200
ATIS		270.100
Appr/Dep	120.450	385.500
	124.200	336.400
	124.600	395.000
	126.650	393.100
Tower	124.450	289.600
Ground	121.800	275.800
Clearance	119.700	335.800
Air Combat Command Command Post		
(HaveQuick timing)	287.450	
("Raymond 24")	141.650	305.600
	139.950	381.300
METRO (weather)		344.600
AWACS Command Post	305.600	
Flight tests		382.600
AWACS tactical		375.925
Operations (terminal)	119.150	
Air Refueling Routes		
#111	(F-1) 348.900	(F-2) 319.700
#314	(F-1) 295.800	(F-2) 319.500
#646	(F-1) 238.900	(F-2) 260.200
GROUND OPERATIONS:		
Maintenance (aircraft)		407.375
		407.550
Fire Department/Crash Crews/Trucks		163.5875
	165.6625	
Medics	164.9625	
Base operations	165.6875	
		408.800
Security	163.4875	
	164.175	
	150.315	
Office of Spc Invest	40.17	
	40.19	

SHAWNEE MUNI. AIRPORT, SHAWNEE

REMARKS- Attended 7:30 am - 6 pm.

CTAF/UNICOM	122.700	
Appr/Dep	132.200	338.350

LAWTON MUNI. AIRPORT, LAWTON

REMARKS- Attended 5:30am-9:30pm.
PILOT ALERTS!! ** Flocks of birds on and in vicinity of airport!!

CTAF	119.900	
UNICOM	122.950	
ATIS	120.750	
Appr	120.550	233.200
Dep	120.550	233.200
Tower	119.900	257.800
Ground	121.900	

FORT SILL, LAWTON

[HENRY POST ARMY AIRFIELD;
111th ARTILLERY CORPS; ARMY
FIELD ARTILLERY CENTER AND SCHOOL]
AIRFIELD OPERATIONS:
REMARKS- Operations 6 am - 8 pm Monday-Friday, and closed Saturdays, Sundays and holidays.
PILOT ALERTS!! ** Extensive Night Vision Goggles training!!
** Heavy helicopter traffic on and in vicinity of airfield!!

PTD*	123.050	376.700
ATIS	135.425	241.000
Appr/Dep	118.600	248.200
	120.550	233.200
	127.300	227.300
Tower	124.950	229.400
Ground	121.700	231.400
Clearance	118.600	248.200
METRO (weather)		375.200

*PTD-Pilot to Dispatcher
GROUND OPERATIONS:
Fire Department/Crash

Crews/Trucks	173.4125
	173.4625
Motor Pool	165.0875
Maintenance	173.4875
Security	163.125
	164.100
	163.5625
	173.5625
Range Control	30.50
National Guard Oper	40.10
	46.90
Explosive Ordnance Disp	49.70
	49.80
Air Force Operations	142.250

PAULS VALLEY GENERAL HOSPITAL HELIPORT, PAULS VALLEY

REMARKS- Attended continuously.
CTAF 122.900

PAULS VALLEY MUNI. AIRPORT, PAULS VALLEY

REMARKS- Attended 8 am - 5:30 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Power lines and poles on and in vicinity of airport!!
** Ultralights on and in vicinity of airport!!

CTAF/UNICOM	122.800	
Appr/Dep	128.100	327.150

COPLAND AIRPORT, DUNCAN

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
CTAF 122.900

HALLIBURTON FIELD, DUNCAN

REMARKS- Attended 7 am - 8 pm.
PILOT ALERTS!! ** Power lines and poles on and in vicinity of airport!!

CTAF/UNICOM	122.800	
Appr/Dep	118.600	248.200
Clearance	118.400	

ENID WOODRING MUNI. AIRPORT, ENID

REMARKS- Attended Monday-Friday 5:30 am - 11 pm, and Saturdays and Sundays 7 am - 9 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF	118.900	
UNICOM	122.950	
FSS	122.600	
Appr/Dep	127.800	319.100
	121.300	291.100
Tower	118.900	398.200
Ground	121.900	

NORTH/HIRST AERO SPRAY AIRPORT, ENID

REMARKS- Unattended.
CTAF 122.900

VANCE AIR FORCE BASE, ENID
[71st FIGHTER TRAINING WING]
AIRFIELD OPERATIONS:
REMARKS- Operations 7 am - 7 pm weekdays, and 10 am - 5 pm Saturdays and Sundays, and closed to all traffic at other times and on holidays.
PILOT ALERTS!! ** Aircraft inbound with VIP's aboard contact "Vance Operations" on 372.200 when 20 Minutes out!!

SFA/PTD		372.200
ATIS	115.400	271.800
Appr	125.450	388.200
	118.075	326.200
	121.300	291.100
	125.450	388.200
	120.525	358.300
	119.775	378.800
Dep	120.525	358.300
	121.300	
Tower	124.050	348.400
Ground	121.800	289.400
Clearance		225.400
METRO (weather)		342.500

GROUND OPERATIONS:
Fire Department/Crash

Crews/Trucks	173.5875
Maintenance (aircraft)	165.0125
Maintenance (base)	163.5125
Security	173.4125
	165.0125

STILLWATER MUNI, AIRPORT, STILLWATER

REMARKS- Attended 7 am - 10 pm.
PILOT ALERTS!! ** Aerobatic flight and practice area in vicinity of airport from 1500 feet to 4000 feet above ground level!!

CTAF/UNICOM	122.700	
FSS	122.300	
Appr/Dep	128.300	291.700

ANADARKO MUNI. AIRPORT, ANADARKO

REMARKS- Unattended.
CTAF 122.900

HUSCHER FIELD, CACHE

REMARKS- Unattended.
CTAF 122.900

CARNEGIE MUNI. AIRPORT, CARNEGIE

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Power lines and poles on and in vicinity of airport!!
CTAF/UNICOM 122.800

CHANDLER MUNI. AIRPORT, CHANDLER

REMARKS- Attended irregularly.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF/UNICOM	123.050	
Appr/Dep	128.300	

CHICKASHA MUNI. AIRPORT, CHICKASHA

REMARKS- Attended Monday-Saturday 8 am - Dusk.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute Jumping/Skydiving in vicinity of airport!!

CTAF/UNICOM	123.000	
Appr/Dep	124.600	395.000

CUSHING MUNI. AIRPORT, CUSHING

REMARKS- Attended continuously, and the airport is unattended Christmas, New Years, and Thanksgiving.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute Jumping/Skydiving in vicinity of airport!!

CTAF/UNICOM	122.800	
Appr/Dep	128.300	291.700

CRAZY HORSE MUNI. AIRPORT, DAVIS

REMARKS- Attended continuously.
CTAF 122.900

EL RENO AIRPORT, EL RENO

REMARKS- Attended Monday-Friday 8 am - 5 pm.
CTAF 122.900

EL RENO MUNI. AIR PARK, EL RENO

REMARKS- Attended November-March 8 am - 6 pm, and April-October 8 am - 8 pm.

CTAF/UNICOM	122.800	
Appr/Dep	124.600	395.000

RED ROCK AIRPORT, HINTON

REMARKS- Unattended.

CTAF	122.900	

DAVID JAY PERRY AIRPORT, GOLDSBY

REMARKS- Attended Monday-Friday 9 am - 5 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute Jumping/Skydiving in vicinity of airport!!

CTAF	122.900	
Appr/Dep	120.450	

KINGFISHER AIRPORT, KINGFISHER

REMARKS- Attended 8am-Dusk.

CTAF	122.900	

MC CASLIN AIRPORT, LEXINGTON

REMARKS- Unattended.

CTAF	122.900	

UNIVERSITY OF OKLAHOMA WESTHEIMER AIRPORT, NORMAN

REMARKS- Attended 7 am - 8 pm.
PILOT ALERTS!! ** Power lines and poles on and in vicinity of airport!!
** Use extreme care!! Coyotes on and in vicinity of runways!!
** High density student operations on and in vicinity of airport!!
** Helicopter traffic on and in vicinity of airport!!
** National guard flight detachment operations on and in vicinity of airport on weekdays from 7:30 am–4 pm, except holidays!!

AWOS-3	119.550	
CTAF	118.000	
UNICOM	122.950	
FSS	122.150	
Appr/Dep	120.450	385.500
Tower	118.000	
Ground	121.600	
National guard oper	38.45	

PURCELL MUNI. AIRPORT, PURCELL

REMARKS- Unattended.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!

CTAF	122.900	

WATONGA AIRPORT, WATONGA

REMARKS- Attended 8 am - 5 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Golfers on West side of runway!!

ADA MUNI. AIRPORT, ADA

REMARKS- Attended Monday-Saturday 8 am - 5 pm.
PILOT ALERTS!! ** Tall trees in vicinity of airport!!
** Parachute Jumping/Skydiving in vicinity of airport!!
** Unlighted 80 foot antenna located 400 feet East of Runway 35 centerline!!

AWOS-3	117.800	
CTAF/UNICOM	122.800	
FSS	122.450	
Appr/Dep	128.100	327.150

THOMAS P. STAFFORD AIRPORT, WEATHERFORD

REMARKS- Attended 8am-Dusk.

CTAF/UNICOM	122.800	
Appr/Dep	128.400	

CLINTON MUNI. AIRPORT, CLINTON

REMARKS- Attended 8 am - 5 pm.

CTAF/UNICOM	122.800	
Appr/Dep	128.400	290.200

CLINTON-SHERMAN AIRPORT, CLINTON

REMARKS- Attended Monday-Friday 7 am - 8 pm.
PILOT ALERTS!! ** Heavy jet training surface to 5,000 feet within a 25 Nautical Mile radius of airport, and small aircraft are advised to contact tower on for pilot clearance to land due to wake turbulence generated by heavy jets!!

CTAF	119.600	
UNICOM	122.950	
Tower	119.600	256.900
Ground	121.700	239.000

PERRY MUNI. AIRPORT, PERRY

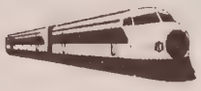
REMARKS- Attended continuously.

CTAF	122.800	
Appr/Dep	127.800	

PONCA CITY MUNI. AIRPORT, PONCA CITY

REMARKS- Attended 7 am - 9 pm.
PILOT ALERTS!! ** Ultralights on and in vicinity of airport!!
** Balloons on and in vicinity of airport!!

CTAF/UNICOM	123.000	
FSS	122.250	
Appr/Dep	127.800	319.100



By Land

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ATCHISON TOPEKA & SANTA FA

AT OKLAHOMA CITY		
Repairs	WXB857	160.440
Maintenance of Way	WXB857	160.560
Maintenance of Way	WXB857	161.010
Road	WXB857	160.650
Yard (hump)	WNUF256	161.280
Yard	WXB857	161.235
Yard	WXB857	161.370
Yard	WXB857	161.415
Yard	WXB857	161.505

BURLINGTON NORTHERN

AT OKLAHOMA		
Road	KKG742	161.160
PBX	KKG742	161.130

TAXI CABS

OKLAHOMA CITY		
Safeway Cab	WNYA619	152.300
Safeway Cab	WNYA619	157.560
ABC Cab	WNXY387	152.330
ABC Cab	WNXY387	157.590
Edmond Cab	WNPU957	152.390
Edmond Cab	WNPU957	157.650
Yellow Cab	KKB337	152.420
Yellow Cab	KKB337	157.680
B & B Cab	WNXX900	152.450
B & B Cab	WNXX900	157.710
Checker Cab	KNJR600	452.100/457.100

TRUCKING COMPANIES

Turner Brothers	KVT749	44.14
Bill Hodges Trucking	KCJ226	44.24
Consolidated Frtways	KBG392	452.625
Consolidated Frtways	WNHV869	159.150
Central Freight	WPAF786	160.170
Roadway Express	WXY439	160.140

OKLAHOMA TURNPIKE AUTHORITY

Hwy Maintenance	WNZY955	156.105
Hwy Maintenance	WDB52	169.000
Hwy Maintenance	WDB52	159.120

By Sea

AT OKLAHOMA CITY

Oklahoma Boat Club	WHW808	156.425 Comm/Rec
Oklahoma Boat Club	WHW808	156.450 Comm/Rec

USSN

The Other Half

Only A Few Weeks Into The New Year

"Diamond Jim," "Honey Didn't," "Little Black Book," "Freaking." All this and much more!

by Janet Cravens

To those of you who enjoy reading Roger's column, I'm sorry to have to report that Roger will not be able to write this month. As most of you know, the government has been shut down twice in the past couple of months. He's had entirely too much time on his hands and doesn't know how to write unless he's under a lot of pressure. Seeing as how we all know what a scanner nut does when he has ten extra minutes a month, you can guess what the last few weeks have been like.

I tried to look at the government shutdown as a positive event. Roger was off, hopefully with pay, for the entire holiday period. The boys were out of school at the same time. I, of course, was still holed up in the bedroom trying to recover from the accident, but when you don't have anything to do all day but think, that "Honey Do" list can get pretty long.

I had already decided that it was past time for my bulbs to be put into the ground for a successful spring, but I am unable to do that. So I sweet-talked the boys (I thought) and Roger into doing my planting for me as a Christmas present. Yeah, like I'm glad I didn't hold my breath. Roger (one of my friends calls him Diamond Jim) bought me the obligatory piece of jewelry as his atonement-at least, I think that's what it was, because my bulbs certainly didn't get planted. One of my sons bought me a new 1995 World Series Champion Atlanta Braves tag for the front of my van, and quite frankly, the other one didn't even try and fake it.

Lying on my bed flat on my back for such a long time, I've found all kinds of spider webs in the corners, & windows that need to be washed, and I was really looking forward to Roger and the boys finally getting the wood chopped up from the trees we lost when Hurricane Opal hit. I wanted a storage shed built or at least the garage cleaned out. I could see lots of winter grass seed that could have been put out, and of course, the Azaleas, that I'm still trying to decide where they need to go-after three years need-to be moved.

As I said, no one could have been more pleased that I was going to have these three, strong men to fetch, tote, carry, dig, and plant everything to my little heart's content. I had visions of grandeur of saying goodbye to the spider webs in the corner of my bedroom before they started writing "wash me" on the walls. I could just imagine how sparkling clean my front door and patio doors would look when they got through cleaning them. I even bought some Brasso so they could shine the brass door plate on the front door.

Well, I guess I don't have to tell you that Roger gave me back his honey-do" list as soon as the furlough was over. The top of the page, he wrote "Honey Didn't." Not a single little thing on my huge honey-do list got done. The spiders have hatched and are currently working on a mural design for one wall in my bedroom. The garage really isn't messed up as long as you can walk to the freezer, washer and dryer, so they couldn't see the reasoning behind cleaning the garage. But more importantly, my husband and my children didn't plant my bulbs for me because they know how special that is and they didn't want to deprive me of the opportunity of playing in the dirt again as soon as I am better. Wasn't that sweet of them?

Roger, of course, had many other things to do on *his* list. He went up town to sit in the church parking lot between the police department and the Sheriff's Office. He took his frequency counter, his 1996 Police Call Plus, his portable scanner (the Bearcat 200XL), and many other important pieces of documentation pertaining to scanning and frequencies. I call this "freq'in" (pronounced freaking). He has to go looking for new frequencies at least once a month. He's so sweet he usually asks me to go along for the drive so I can drive while he watches the frequency counter.

Of course, I made the sad mistake of buying him that ham radio he wanted, a Kenwood 742A, for Christmas. Since Christmas, he's only eaten twice, but you know what? Remember how I used to have a hard time getting him to run errands? It's not nearly as hard anymore-the problem now is keeping him in the house, since the radio is being used in his truck. As a matter of fact, I'm sure you'll not be surprised to find out that he didn't ride to church in my van with me and the kids last Sunday because he "had" to take his truck. He may never go off with me again. One of my friends said I should take applications from people who would like to take me out every once in a while or maybe take me places so when Roger has his head hidden in the radio, I can still have a life. Maybe I can have a "little black book." Nah, it's too hard to

train a new husband. I just have to remember that if you can't lick them, join them. Is that the other way around?

I thought you might like to know my entire family has gone scanner crazy. It was bad enough when it was just Roger listening; then my parents bought a small 20-channel scanner to listen to when my Dad has to spend a lot of time in bed due to ill health. Both my parents started listening and although each one of them blames the other for not being able to turn the stupid scanner off, the fact remains, the scanner never gets turned off.

Roger has had to fix their scanner several times because the antenna keeps breaking off. The last time it broke, we put it in the shop and had it fixed. The technician told us that it would not be able to be repaired again should the antenna break. In November, Mom told me that the radio had to be turned a certain way before it could pick up anything because the antenna had come loose. I thought, this would be a perfect Christmas gift to replace their broken scanner with a new one.

I mentioned several months ago that we bought Mom and Dad a new Radio Shack Pro 2040 for Christmas. I thought Roger would bust a gut before Christmas day actually got here because he was so excited. On Christmas day, Dad opened the gift and his mouth dropped open. After looking at me sternly and telling me we shouldn't have done that, he called Mom over to look at it.

The next day I called to see how they liked the radio and to see if they were able to pick up more frequencies and hear more. Mom said they'd been listening and it was real nice; then she said, "I brought the other one into the kitchen so I can hear it when I'm in this end of the house." Now I'm worrying that my parents are worse than Roger. He has two scanners, but one is a portable, the other a desktop; however, he doesn't have them on in two places in the house at the same time so he can hear at all times what's happening.

The other day during a "winter storm," two children got hit by a car one block over from my brother's house. My mother was in the kitchen when she heard this, my dad was in the bedroom. My mother realized this was close to my brother's house, so she picked up the telephone to call my brother and made sure the kids are all right. She heard Daddy talking on the phone, so she laid the phone down and waited a few minutes until she heard him hang up. She called my brother to check on the kids. It wasn't them, they were in the house playing so she could relax. Later, my dad came out of the bedroom to eat dinner and my mother mentioned to him about the two kids who got hit. She asked him if he had heard it on the scanner, he said yes and as soon as he heard that, he called my brother to see if the kids were okay. I know our lives will never be the same.

My nephew told his girlfriend he'd like a scanner for Christmas. She scrimped and saved and managed to buy the one he wanted. Now she's ready to choke him because it has to go everywhere with them. They announced to the family at Christmas that they will be getting married in February. We were all excited to hear this. The past several weeks has been talk of weddings, showers, receptions and honeymoons. They visited us this past weekend. They have decided to go to Orlando for their honeymoon and he wanted Roger to give him a list of frequencies he could listen to while they were down there. To say that his girlfriend does not understand this concept of a radio on her honeymoon is an understatement. I'm not sure but what the wedding may be called off because she refused to honeymoon with the radio. Young Love!

Life goes on in the big country. Some things never change and other things won't. Roger reminds me all the time, at least I know where he is, he's not out carousing and chasing women and he's not out drinking. You know that radio he wanted so he could "talk to me" on it? He's had it for three weeks and hasn't called me yet. Sure am glad he comes home every night-at least I can still see him. He may never talk to me again until I decide to get my ham license. There's always hope.

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Antennas

Diversity Communications

The four types of Diversity Communications are discussed: Space; Frequency; Polarization; and Time.

by W. Clem Small, KR6A, CET

Most scanning is accomplished with fairly "standard" antennas: A rubber duck; a groundplane; or a vertical dipole. These "workhorse" antennas all fill an important niche in the activities of most scanner operators; we have a lot of fun with these skywires. This month let's take a walk on the wild side and look at some of the more exotic uses of antennas, where special circumstances require something out of the ordinary. Let's discuss what is called "diversity communications."

Diversity communications is the name given to a group of techniques which are used to combat fading in the reception of radio signals. Although diversity was originally employed only on long-haul reception of High Frequency, ionosphere-propagated signals, where fading is a particularly bad problem, these techniques are quite useful at times for VHF UHF and microwave work. There are four different types of diversity communications: space; frequency; polarization; and time.

Types Of Diversity Communications

Space Diversity–Space diversity is an effective means of combating the effects of fading. It makes use of the fact that the strength of an incoming radio signal varies from place to place over the area in which it the signal can be received. The signal may fade away in one location and yet be strong in another nearby location; in a few seconds or minutes the situation may reverse. If we could just erect an antenna in both locations, and continually switch to whichever one received the stronger signal, then we could reduce the effects of fading and have more useful reception. There are commercially available equipment systems which do this switching automatically by electronically comparing the outputs of two or more antennas, and then selecting the stronger signal. Other systems combine the signals from all the antennas and use this combination to maintain a fade- resistant output. Various kinds of circuitry have been developed for this purpose, and most diversity systems are complex and expensive. On the other hand, it is possible to approximate diversity reception inexpensively in ways we will discuss below.

Use of the term "diversity" in this approach refers to the multiplicity of antennas used in receiving the signal; as we will see below with both frequency and time diversity, the diversity in some systems in based on the transmitting end of the communications link, rather than on the receiving end. Diversity with a two-antenna system is called "dual diversity"; systems with four antennas are called "quadruple diversity."

Frequency Diversity–Frequency diversity is also quite effective in reducing the effects of fading; it requires the use of two or more frequencies simultaneously, and the same information is transmitted simultaneously on all of these frequencies. Note that here the diversity is in the transmission (two or more transmitters); it is even possible to get by with just one transmitting antenna. A basic frequency diversity receiving system can utilize one antenna and two or more receivers connected to that antenna via a signal splitter. Each receiver is tuned to one of the frequencies on which the information is being transmitted. Frequency diversity is difficult to implement in that it requires multiple frequency assignments, and the RF spectrum is so crowded these days that the extravagance of using multiple frequencies to send just one signal does not often find approval with regulatory agencies such as the Federal Communications Commission.

Polarization Diversity– Polarization diversity depends on the fact that it is common to find that the polarization of a radio signal changes as it propagates from the transmitting antenna to the receiving antenna. This can be due to various factors such as passage through the ionosphere or reflection from large surfaces. Regardless of the polarization originally given to the signal by the transmitting antenna, signals often arrive at the receiving antenna with a very different polariza-

tion than that with which they started. By utilizing two or more antennas at various polarizations we can employ the same sort of electronic, antenna selecting or combining equipment as with space diversity reception; this equipment monitors the output of each antenna and either combines the signals from all antennas for a fade-resistant, combined signal, or automatically selects the antenna with the best signal, and routes that to the receiver's audio system. The various types of diversity reception can be combined to produce even more fade-resistant results. For instance, although polarization diversity is the least effective type of diversity reception, it can be of value, especially if used along with space or frequency diversity. We could have antennas at two different antenna locations to support space diversity, and at each location we could have both a horizontally polarized and a vertically polarized antenna to support polarization diversity. The reduction in fading due to the combination of the two types of diversity should exceed that of either type used alone.

Time Diversity–One form of diversity which is often overlooked in diversity discussions is time diversity. A crude form of this kind of diversity occurs when shortwave broadcast programs are transmitted at several times during the day; if the signals fade too much at one time of day they may come in better (i.e., with less fading) at a later time.

Note that in time diversity as discussed thus far the basis of the term "diversity" rests on the use of diverse times of transmission and reception, not on specialized equipment. A more sophisticated type of time diversity, which does require special automated equipment, is incorporated into various forms of digital communications such as SITOR, AMTOR and Packet. In these systems the information to be transmitted is sent in small groups of characters, and each group is transmitted and then automatically re-transmitted if the receiving station indicates that it did not correctly receive that group; re-transmission of that group then continues automatically until the receiving station signals that it has received the group correctly, and then the next group is sent. This kind of diversity provides extremely accurate, virtually error-free communications.

Applications Of Diversity Communications

Data communication links often utilize one or more forms of diversity reception. In times past, when radioteletype was a principle form of getting private, military and commercial messages across the oceans, diversity reception was an important part of that technology; diversity allowed much more efficient message exchange than was otherwise available. As VHF, UHF and microwave frequencies became more important avenues of communication, diversity systems were developed for these frequencies too. In particular, over-the-horizon communications via tropospheric scatter employs diversity systems to improve the reliability of its data exchange. These systems frequently utilize quadruple diversity equipment.

Terrestrial microwave communications systems operating below 30 GHz are often plagued by fading caused by precipitation, and space diversity is frequently employed there for that reason. The rule of thumb for spacing of the antennas to counteract precipitation-caused fading for these systems is to use about a 200 wavelength long separation; practical systems use separations of from 1 to 30 kilometers. Fading can usually be kept to a maximum of 10 dB by these systems.

For other microwave systems using diversity to combat less severe factors than precipitation, much shorter separation distances are acceptable. For example, antenna separation distances of only about 30 feet are practical at 6 GHz. In these systems both antennas are mounted on the same vertical tower.

Where frequency diversity is utilized a minimum separation of 2% of the operating frequency is required; 10% is desirable, but seldom allowed due to the crowded band conditions.

Moving closer to the frequencies more likely to provide interesting scanning activity, signals on the VHF and UHF bands which must pass through a long stretch of atmosphere often experience seemingly random fluctuations in polarization due to what is called "Faraday rotation." This is especially apparent when monitoring transmissions from satellites because these signals pass through the earth's atmosphere for quite a distance. The usual solution to the resulting fading problem is to employ a single antenna with what we might call an "automatic, built-in diversity." For instance, the crossed dipole antenna provides circular polarization which responds well to any polarization at any orientation. Although such an antenna does introduce a 3 dB loss into the communication circuit, it prevents much greater randomly occurring fading losses, some as heavy as 30 or more dB, which would result from cross-polarization losses with ordinary (linearly polarized) antennas. And so circular polarization is a tremendous advantage at times for such work.

Essentially all the signals which we scan on the VHF band are transmitted with a vertical polarization due to the use of vertical whips on the mobile units and vertically polarized base-station antennas on that band. For various reasons, it is not too uncommon to find that those signals, once they have reached your receiver, may have any polarization from vertical to horizontal! The Radio Society of Great Britain, in the sixth edition of its Radio Communications Handbook, describes a fairly sophisticated, homebrew beam antenna with its polarization switchable over a wide range to combat this problem. As a less ambitious solution to this problem

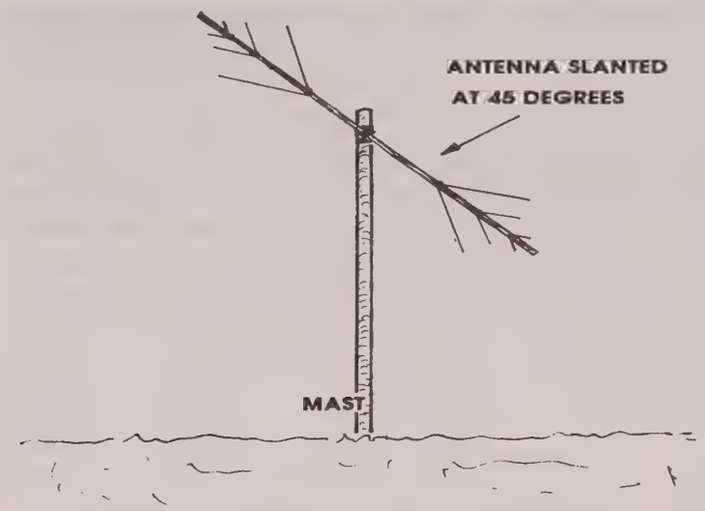

FIG.1. A method of slanting a receiving antenna to compensate for signal

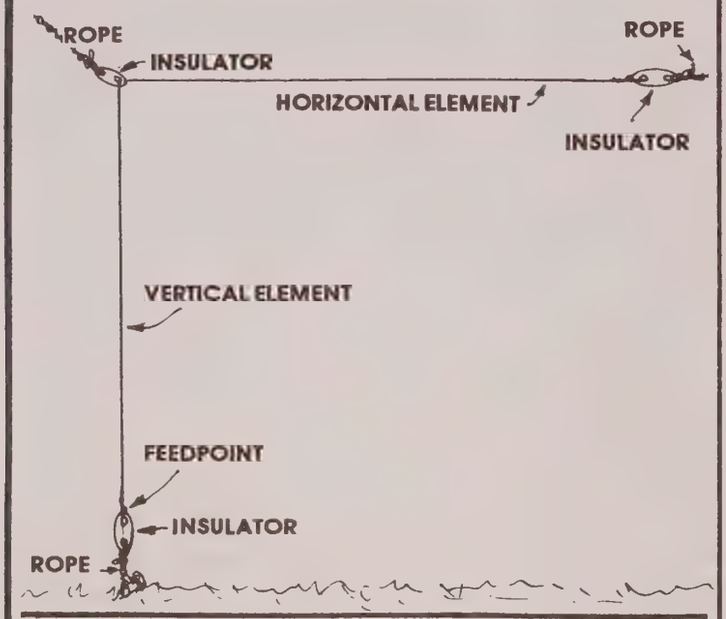

FIG.2. An inverted-L antenna.

they suggest tilting the antenna 45 degrees from the vertical, so that it is mounted at a slant (fig. 1). Although this causes a loss of approximately 3 dB on vertically polarized signals, in the overall a gain of 6 dB is claimed for the effect which the slanting has on the varying polarity of the signals with which it must deal.

Many scanner operators have access to the HF band now that the newer scanning receivers cover such tremendously wide portions of the RF spectrum. HF band antennas with both horizontal and vertical active elements, such as the inverted-L for example (fig. 2), are thought to have a "built-in" polarization-diversity effect. Very long long-wire antennas are sometimes said to have a space-diversity effect for obvious reasons.

Another simple diversity technique, which you may have available via your HF receiver, is to tune an ordinary AM signal to zero beat (no squealing sound remains) in the single-sideband mode of reception. As the signal experiences a fade, by switching from one sideband to the other you can sometimes reduce the fading. This is a kind of frequency diversity; the small change in frequency which occurs when you change sidebands can sometimes be enough so that one sideband is getting through the atmosphere's selective fading better than the other sideband!

A Poor Man's Diversity System

If you have, or are willing to put up, two or more antennas for the same band then you can try this "Poor Man's Diversity System." The system consists of an antenna switch (fig. 3) and you, as you attend to the incoming signal level, ready to switch to a different antenna when a fade becomes severe. Your antennas can differ in location, polarization, or in both of these factors. If you have situations in which signals have severe fading it may be worth your time to try this simple system.

That's it for this month, if you have special antenna-related topics you'd like to see covered in this column, drop me a line in care of USSN.

USSN

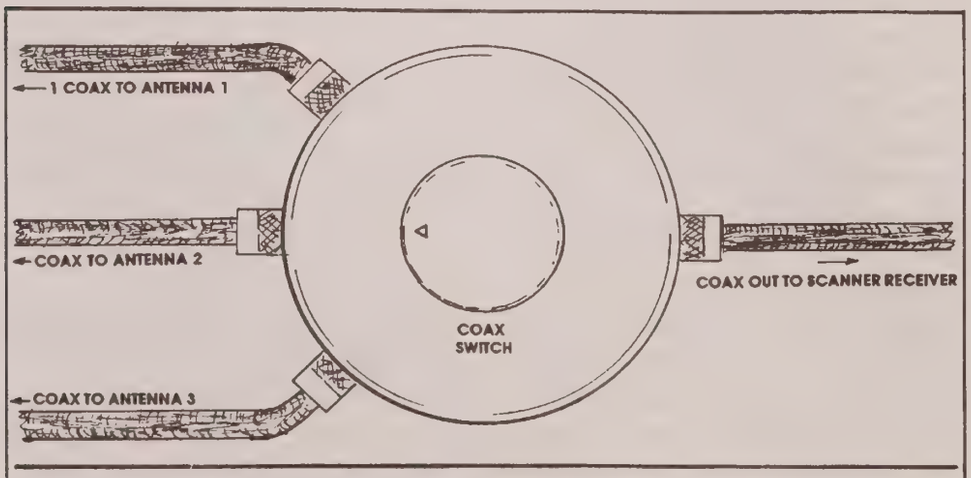

FIG. 3. A manually-controlled receiving-diversity system.

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Beginners

Antenna Basics

What kind, where, how high, which feedline? Even a paper clip will work!

by Laura Quarantiello

Occasionally I do something stupid, really stupid. I know this doesn't surprise you, but bear with me, I'm trying to make a point here. Once in a while I disconnect the antenna from my scanner and forget to reconnect it. After a few minutes, I start shooting the scanner odd looks, wondering why it's not talking to me. Then the thought hits me like a wet fish between the eyes: the antenna! No antenna, no reception. You may have the hottest scanner on the market, the flashiest receiver ever seen in the fifty states, but without an antenna that scanner is just so many inert components lying around with nothing to do. You see, the antenna is the ears of your system, the scanner is only the brain. Unless you give that brain some ears to hear signals, it can't process them into audio. Ergo you won't hear a blessed thing from the speaker but the haunting sound of static.

"So, what kind of antenna should I use?" Glad you asked. You see, most people just stick with the little silver whip antenna or the rubber duck that comes packaged with their scanner. That little whip does fine if all you're concerned with is hearing local signals, those communications that boom into your receiver from close transmitters. A paper clip could pick those up with amazing reliability. (Try it, it works!) But you're a serious listener, I can tell. You really want to let your scanner hum with its full potential and the standard whip isn't going to do the job for you. Why not? Have a seat, my friend. Let's talk!

Radio waves are haphazard little devils. They're easily sidetracked by buildings, trees, hills, mountains and the other up and downs of our earth's terrain. It's almost as if you need to get up above all that trash to have a clear shot at nabbing them. Your little whip antenna is buried at the bottom of the trash heap and the radio waves don't even see it down there most of the time; they pass it right by. Get your antenna up higher, however, and like a red flag in front of a charging bull, many of those radio waves will zero right in.

The antenna that is most irresistible to radio waves is the outdoor antenna. Sitting up there nice and pretty on top of a house, an outdoor antenna has a far better chance at avoiding all the buildings, trees, hills and various terrain changes that trap and distract a radio wave. Forget the whip, this horse will run just fine if you give him some height. To answer your original question, which you knew I'd do sooner or later; you should use an outdoor antenna.

What's that? You're an apartment dweller! That's okay, even if your evil landlord won't allow an outdoor antenna, try mounting one indoors, near a window. I practically guarantee it will help improve things. Folks have done some imaginative things with antennas indoors. Try running some copper wire from your scanner's antenna input, around the walls of your radio room. Keep it high, at the junction of wall and ceiling and use tacks or tape to keep it up. See how that works for you. There are also some extendable whips available that are longer than the stock whip that came in the scanner box; try your local electronics store for these. One that seems to work best is the extendable whose length you can adjust to fit the frequency band you're monitoring.

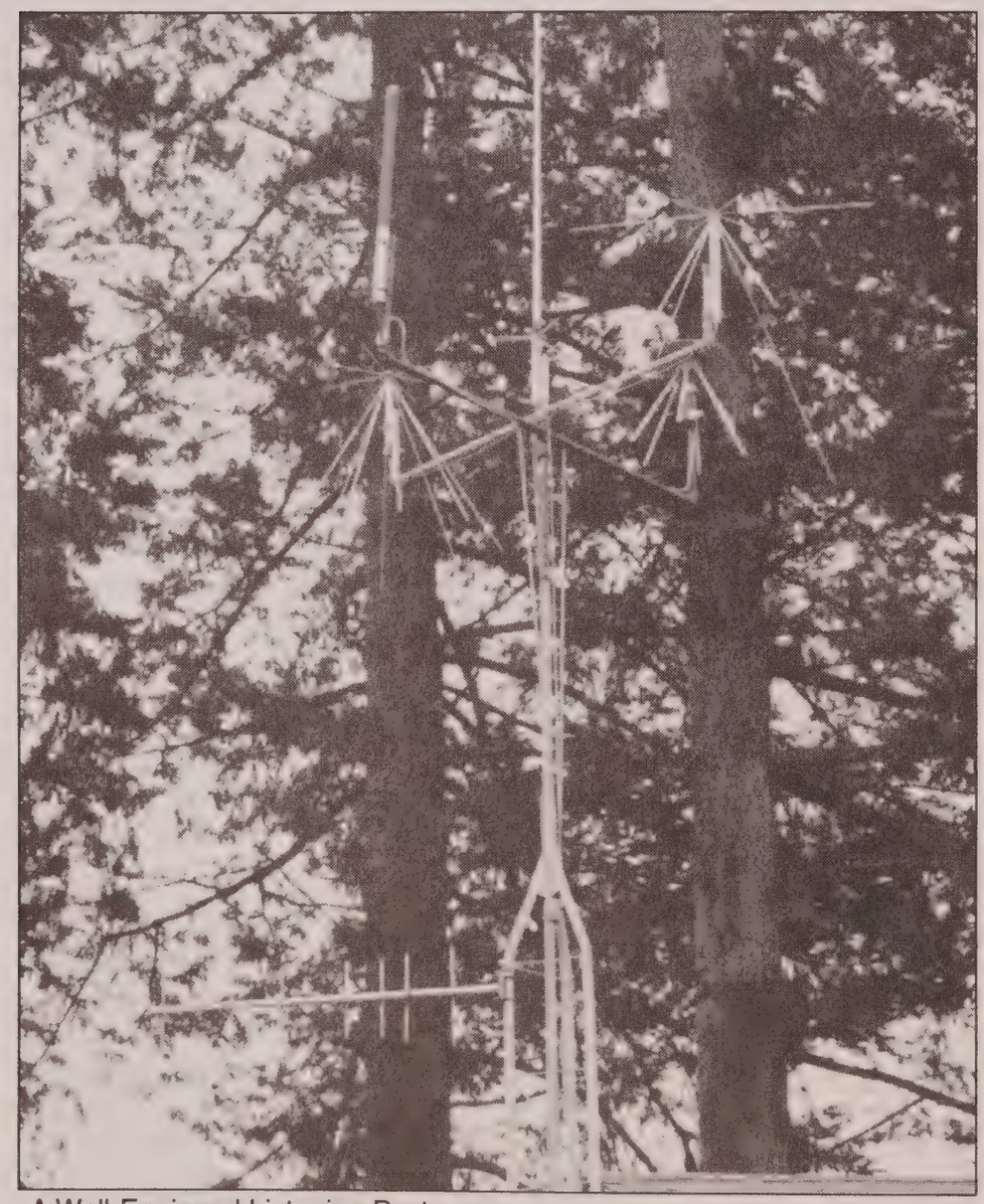
"Fine, but there are so many types of antennas, which do I use?" There are two main types of antennas for scanner listeners; The directional; and the omnidirectional. The majority of listeners use the omnidirectional antenna, such as a discone or ground plane, because it hears signals across the full radio spectrum from 30 to 1300 megahertz, making it ideal for the modern scanner and the all-around listener. A directional antenna such as a beam, "spotlights" a particular direction to the exclusion of most others, which is fine if all you're concerned about is one particular area of listening. Attach it to a TV-type antenna rotator and you'll have more flexibility. If you have no particular targets, think omnidirectional and you'll be alright.

I'd like to give you the name of one brand of antenna and tell you to go out and buy it, but I can't. I'm not being cautious, I just know that each person and their scanner is a separate entity. The antenna that works best for one fella might not work at all for you. Many things affect an antenna's ability to listen, as I mentioned. The only way for you to know what's going to wake up your scanner is to try a few different brands and see which one gives the best results. Remember, if an antenna you purchase doesn't seem to be working well enough, you can always return it.

You did keep that receipt, didn't you?

"Okay, I've got an outdoor antenna up, but I'd like to get better reception." Oh, yeah? My, you're picky. When we're finished here, take a walk outside and look at that antenna way up there. Do you have it mounted at the highest practical point on the roof? Are there any parts of the house blocking it? You can always raise your antenna for better reception, but remember, as my pal Gene Hughes of POLICE CALL says, "some of the signal will be lost in the cable *(that connects your scanner and antenna)* and the longer the cable, the greater the loss. There are cross-over points at which there is more loss in adding cable than in raising the antenna." Higher isn't always better, but experimenting will generally give you a good idea of reception at different heights. Look into using a better grade of antenna cable if your run is over fifty feet. Anything longer than that and you should try RG-8, RG-6 or even Belden 9913 coaxial cable for lower line losses. It can make a difference.

Look around for trees, power lines, poles, and other things sticking up into the sky around your antenna. Branches and leaves should be trimmed back away from the antenna. Power and telephone lines, poles and other things that don't rightfully belong to you shouldn't be touched. Instead, move the antenna-very carefully-to another location on the roof. You want it as far away from nearby objects as possible to give radio waves a clear shot. I'm sure your mother taught you not to play around power lines and she was right. Never take your antenna anywhere near transmission lines of any type. You will become a statistic and fodder for someone else's scanner tuned to the local fire department if your antenna contacts a power line. Stand clear!



A Well-Equipped Listening Post *Photo by Bob Gehri*

"What about preamplifiers?" I never use the beasts. Others do and say some good things about their abilities, but here's the reality; preamplifiers might clean up a signal, but they won't add an inch of distance to the range of your scanner. Preamplifiers will allow you to listen to stations at the limit of your range with a little more clarity, in some cases. You see, preamps don't discriminate; they'll amplify that distant signal, but they'll also amplify all of the noise and closer signals out there. This can make a real hash out of the audio coming through your speaker. The main thing to remember is that the signal has to be there to begin with. Preamps won't pull in nonexistent signals. If you should decide to try one, don't expect miracles. For weak, clear signals, you might end up with some improvement.

"Does a paper clip really work as an antenna?" You still don't believe me, do you? Just about any wire will conduct signals; some are better than others at doing the job, and some are constructed specifically to be signal conductors. They look good on your roof or on the top of your handheld. A paper clip can't be seen on your roof and looks dumb sticking out of your handheld. Call it the ultimate stealth antenna; folks will be laughing so hard they won't believe it actually works. Actually, if you should lose your handheld scanner's antenna, a paper clip will pull in local signals well enough to keep you going until you get a replacement whip. I don't recommend mounting one on your roof and I can't guarantee the results if you do. I've already told you that I occasionally do something really stupid. This would qualify. Remember that your scanner is only as good as its antenna. Put up a good one and you can listen to the world.

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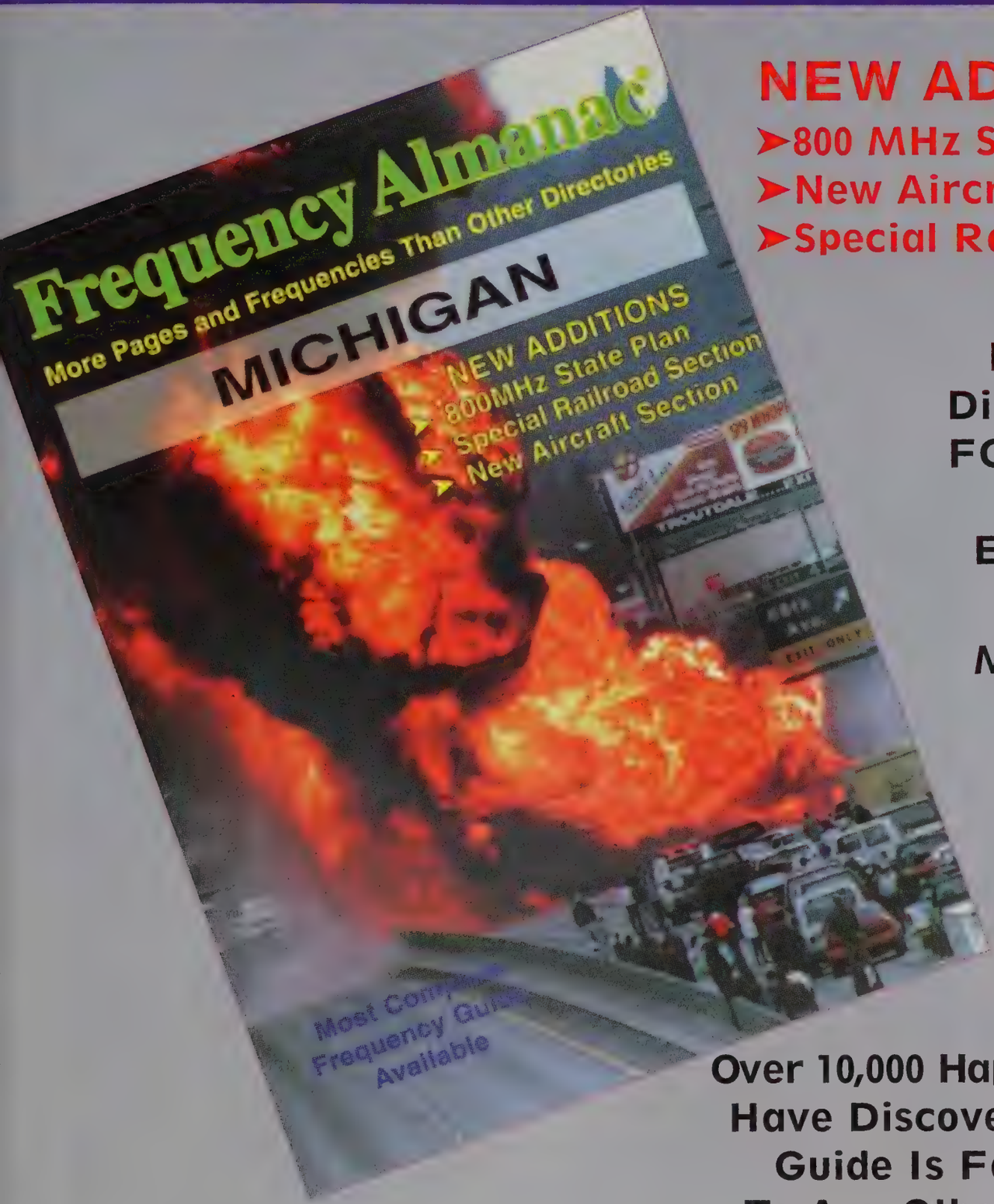

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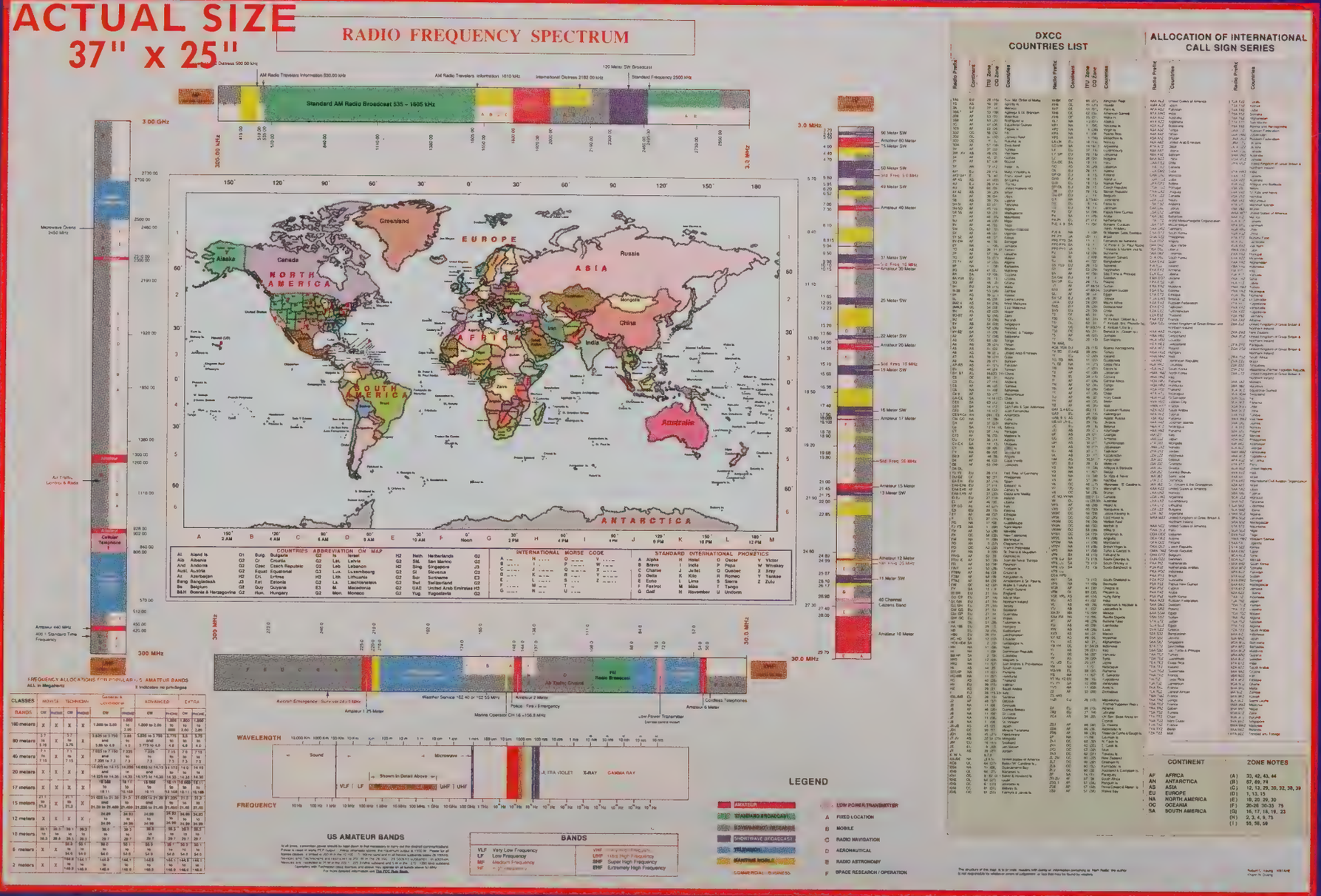

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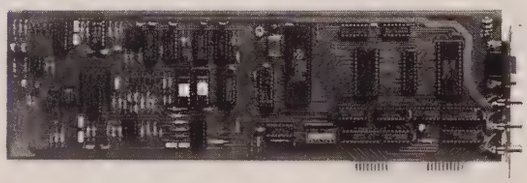

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Technical Stuff

Product Review—Message Tracker

This paging data decoder software package is one of the neatest things to come along for scanner hobbyists in a long time.

by Steve Donnell, WA1YKL

The Message Tracker paging data decoder software package is one of the neatest things to come along for scanner hobbyists in a long time. With it, you can decode numeric (number strings) and alpha-text data sent on POCSAG and Golay format digital paging transmissions. While the technology for doing this has been around for some time, in the form of the Universal M-400 tone and data decoder, the Message Tracker offers much, much more flexibility than seen in the M-400. It is also important to note that the Message Tracker is not the first pager message data decoding software package to be marketed. Others have existed for several years, but have had prices of typically around a thousand dollars. The Message Tracker is certainly the first to be available at a price that most radio hobbyists can afford and still offer many of the same features found on similar software available (affordable) to the commercial market.

With the M-400, you can only decode one data format baud rate at a time and there is no way to eliminate the display of mundane numeric paging data transmissions. Using the Message Tracker, you can display and decode data for numeric and alpha-text pagers all together or select just alpha text data. A real kicker, you can selectively decode paging data for a specific pager's "cap code" or digital address. The Universal M-400, can not see the actual cap code accompanying paging data. The Message Tracker permits you to see the *ACTUAL* pager cap codes for the decoded paging data.

The Message Tracker also has a number of additional bells and whistles (literally). One is that you can have the computer beep you when data with a selected cap code address passes by. The computer will highlight message data information from the selected cap code list on the video screen. You can even direct paging data from all or just selected cap codes to be saved out to disk. This can permit continuous monitoring for special pages while you are busy elsewhere.

Message Tracker software is available in three different feature and price levels: The Basic version, which sells for $139.95, has all of the above mentioned capabilities, can select up to 20 cap codes for selective decoding, has a 250 line display buffer, and has optional time stamping of decoded data.

The Plus version, for $179.95, can select up to 30 cap codes; has a 500-line buffer with a separate buffer for message data from selected cap codes. Along with several enhanced Function key commands that include quick screen-dump to disk, a four-character text string search and a priority alarm to alert the user to any data received from a selected cap code address.

The Pro version, for $239.95, permits you to target up to 100 cap codes, has a 1,000-line text buffer and optional activation of a split screen display where you can view "real time" data in one field and data from selected cap codes or operational statistics in the other field. The statistics-logging capabilities of the Pro version allow for tracking different message transmission parameters such as baud rate, message format, data errors and system efficiency. The Pro version also offers enhancements to it's text string search, with up to 10 characters. The ability to use wild-card characters in both the text search and with selected cap codes is useful for retrieving messages to multi-cap-code groups.

The Message Tracker package consists of: The user's manual; a 3.5" disk; and a simple interface circuit for connecting between your scanner and the RS-232 port on a PC. The suggested computer requirements are a DOS 386 PC or better, with a 3.5" high-density disk drive, at least 1 meg of RAM and 1 Meg free space on a hard drive. In testing however, we were able to get the Message Tracker operating on both our old 286s. (And I'll bet you thought we were some kind of "power user"!) On one PC with only 640K of RAM we were flagged with a reduced buffer size warning, however. We also noticed a somewhat sluggish response to most command key strokes when using the Message Tracker on the 286s. This, of course, vanished when we later tried the Message Tracker on a newer Pentium machine.

Installation

Installation of the Message Tracker onto a PC's hard drive is very easy, even for a "computer dweeb" like me. It

took a couple of days in order for us to figure out how to properly execute the program. Some of this could be directly traced to a case of "tech manual illiteracy," some was due to a lack of a Beginner's Setup section in the manual, which is written by folks who are more familiar with the keyboard on their scanner than on their computer. The Message Tracker's user's manual is one piece that would seriously benefit from certain improvements and updates.

We later realized that we needed to modify the program Execute command with a " /direct" instruction for use with the newer SA-110 interface circuit. We also noticed that if we executed the program when the interface was already connected to an operating scanner, the program would load, but not run at all. This may be related to our use of a 286 machine.

Connecting the Message Tracker to a scanner is very easy, and can be done in two ways: One is to the scanner's external speaker earphone jack; and the other is to connect onto the output of the scanner's FM discriminator. It may take a bit of work, but I *HIGHLY* recommend the latter method. After a couple of attempts with different scanners, we were able to get the Message Tracker to operate with the external speaker audio from our Icom IC-R100, but were encountering a data error rate of nearly 50 percent. Most of the data that we could decode was from signals using the slowest (512 baud) data rate. One area where the speaker audio interface could be useful would be in decoding message data from various paging system links that inhabit much of the 72 to 76 MHz band and other areas of the spectrum. These links use AFSK (Audio Frequency Shift Keying) modulated carriers to relay paging data signals to various transmitter locations. The Message Tracker can be set to work with either direct (FSK digital) modulation, the most common modulation method for digital pagers, or AFSK modulation.

With the Message Tracker set up to work directly off of a scanner's FM discriminator, we typically copied message data 95 to 98% error free. The only problems that were encountered were from signals with multipath distortion where the scanner was receiving signals from more than one transmitter site. This is not a typical problem in most cases, however. Despite the setup deficiencies in the Message Tracker's user's manual, the manual does include a very good description of how to install a discriminator voltage pick off for most scanners using an isolating resistor.

Use of the Message Tracker connected to a scanner's discriminator also requires a simple initial adjustment. This is the adjustment of the interface circuit's reference voltage to the same as that found in the scanner's discriminator. This can be done a couple of different ways. One is simply by eye - adjusting the reference voltage while monitoring the errors on decoded paging data. A more precise method is to use a voltmeter and match, reasonably closely, the reference voltage to that found on the scanner's discriminator output. One drawback to the discriminator interface is that you typically have to readjust the reference voltage if you connect the interface to any other scanners. One way around this would be to include an op amp buffer to provide an adjustable discriminator voltage offset that would be set to the same voltage output.

Besides being able to decode some of the newest 4800-baud paging data transmissions, which thankfully account for only a very small percentage of paging traffic, one improvement I would like to see in the Message Tracker is to be able to group together activation of certain cap codes. This would make it easier to move from one paging channel to another. You could then select the cap code group for the given paging system and channel you wanted to monitor.

Using The Message Tracker

Finding a paging signal to decode is not typically a major problem. A couple of good frequency ranges to look on are: 152.030 to 152.850 MHz; 454.000 to 454.650 MHz; 929.000 to 930.000 MHz; and 931.000 to 932.000 MHz. Two frequencies used by a nationwide paging service known as Skytel are: 931.4375; and 931.9375 MHz. All those "buzzing" sounds you hear are digital paging carriers. With a little practice you will easily be able to identify between Golay and POCSAG format signals, and the different baud rates used in POCSAG paging. Some paging systems will intermix Golay and POCSAG formats, but it is POCSAG that is the overwhelmingly popular format, largely because of a greater number of possible user address codes and the ability to handle larger message text strings. A Golay format transmission has a "pulsed" characteristic to it. While a POCSAG signal starts with a two-tone (always high to low pitch sequenced) sync preamble interval prior to the start of the data sequence.

Initially you will want to set the Message Tracker to decode both Golay and POCSAG formats. Set the POCSAG baud rate select to automatic. On a couple of paging system frequencies I have had trouble getting the Message Tracker to decode unless the POCSAG baud rate was set to a particular speed. This may be due to some paging systems use of a shorter than usual sync preamble on systems where only one baud rate is used. Occasionally the Message Tracker will not switch between Golay and POCSAG formats , but I suspect this may be related to the use of the 286 computer. Both the format switching and auto band rate detection work reliably at least 95 percent of the time.

While the Message Tracker can decode both numeric (number strings such as phone numbers and various 3 to 5 digit codes) and alpha-text paging data, watching all those numbers from numeric-only pages flying by is typically right up their with watching paint dry. You will usually want to select the Message Tracker to decode only alpha-text paging data. From a practical standpoint, the main reason for this is quickly realized; up to 90% of the message traffic on most paging systems will consist of numeric type message

data. The primary concern here is that all those numbers quickly scrolling by will cause you to miss some of the much more interesting alpha text messages. My M-400 is relegated to simply decoding CTCSS and DCS tones these days. Note, however, that a device like the M-400 can still be used effectively with some *VERY* low volume paging systems or to decode POCSAG data from an automated dispatch system or some types of telemetry data. With the Message Tracker set to display alpha-text-only format data, you will still see some messages that consist only of numbers, but these are simply numeric messages intended for alpha-text pagers.

"Low volume" is something not spoken of in any positive context these days in the highly competitive world-paging services. In order to survive, a paging system must be able to support many, many subscribers. This is one of the main reasons for the shift from voice paging to digital data paging in the first place. A typical voice page that requires about ten seconds of "air time" to transmit could also be used to transmit about 100 or more POCSAG format pages at 1200 baud.

Pagers Today

Pagers in general have certainly evolved a lot over the past ten to 15 years. They have gone from small (not tiny) FM voice receivers, activated by audio tone sequences, to being receivers connected to a simple computer, small enough to fit into the space of a watch or a marker pen. Pager users have also become much more diverse. Previously being limited to typically doctors and assorted tradesmen, pagers of different styles and features are now available to nearly anyone. One reason for their popularity is that cost for basic paging services can be as low as $10 to 12 per month. This makes pagers even more economical than cellular telephones as a way of keeping in touch, for people in any profession or among family members.

Along with (or as part of) the increasing popularity of pagers there are also a growing number of new types of "information" services available by way of alpha text pagers. These new services provide pager users instant access to a variety of information, from sports scores and stock market prices to weather and traffic reports, political news and various regional emergency notification bulletins. Data from paging systems that carry any of these different types of services can be decoded with the Message Tracker system. One major drawback to all this is that you can only legally use the Message Tracker to decode paging data transmissions intended for your own pager. (Once again a stupid law that begs to be broken. Ed)

Those folks familiar with some of my other writings may have noticed my long fascination with pagers and paging technology. Years back when voice paging was much more common, we monitored certain paging channels to catch the sometimes interesting and even humorous voice paging messages that were sent. Often this would remind me of the strings of rapid fire "one liners" as seen on the old television comedy show, "Laugh In." Digital paging became more common we even built a simple tone decoder circuit that would activate the scanner's speaker only when voice pages were sent, using a particular tone preamble. With the advent of the Message Tracker I am very happy to say we are back to where we can hear it all and see it all, analog (voice) and digital text messages alike.

The Message Tracker hopefully also provides a wider prophesy of the future for scanning than that which is limited to just pagers, as other radio services move toward digital transmission methods. As long as these newly developed modulation system protocols remain as "open" architecture designs then, hopefully, economical and easy-to-use software interface packages will be available to radio hobbyists.

The Message Tracker data decoder is available from: K&L Technology, PO Box 460838, Garland, TX 75046-0838, Tel. 214-414-7198 **USSN**

TYPICAL ALFA TEXT PAGING TRAFFIC

Catch the sometimes interesting and even humorous voice paging messages that were sent.

P1872411	418-0575
P1341537 <E>	NO MATTER HOW YOU FIGURE IT OUT..I'M 32
P1467698	6685672
P1531100	lori 3310 brenda bell
P1531360	ON MY WAY.
P1914543	:FK, CALL ME YOU CLOWN ASAP. 458-9491.
P0163453	7820148411411411
P0805121	2896528
P0163692 <E>	BRAD CALL MARK. I HAVE TO TA
P1911622	` 9GNUTER HAS CRASH, UNABLE 2 DO MAILERS, NEEDS IMMEDIATE ATTENTION
P1487270	187-187-187-187-187-187-187-187-
P0785878	296-2985214-411
P0826548	ONL AAA + 220 WASH ST- BARBARA MARTIN 85 ISSUZU 543-0387
P1309531	NO.ATTLEBORO CALLS GOING TO ATTLEBORO..PSAP PROB
P0140103	CEMBER 13, 1995 7A-3P
P1309258	3911134
P1240812	YES I AMMMMMMMMMM..... WHAT ARE YOU GOING TO DO ABOUT IT....696969696
P1766114	4458764-47
P1868367	6664021
P1554840	5220872-91111
P1465736	SWEETIE...BOTH THE KIDS HAVE A TV..JOSH DIDN'T REALLY LIKE SEG
P1607022	U/D BALTIMORE CO: DWELLING / 612 GEORGE -
P1341548	5086643614
P0816567 <E>	PLEASE CALL TONYA/201*275je]
P1465736	NINTEDO GAME...
P1486301	YOU BETTER COME CORRECT L.D., BECAUSE AINT NOBODY A HOE THIS WAY
P0379039	AUNTIE LUCY CALLED AND SAID
P0123294	DO NOT GO TO SLEEP.
P1708850	8677445
P1701128	9111111111111111
P1309257	CALL DANNY AT 239 6026
P0067015	A21 MCMENANIN 617 237 4986 NEED TO MAKE ANOTHER APPT.
P0164069	SHARON AND NIKKI
P0822878	DANNY, DON'T FORGET A RADAR FOR MY CAR. LOVE LISA.
P1595443	CALL JACQETTA.
P1244380	SH CCU X3523 PT. HUNG PT/MOTTA
P0706065	COME TO MELISSA'S PLEASE TO SEE MY PUPPY
P0123248	PLEASE CALL MALCOLM AT HOME, URGENT.
P1517302	PLEASE CALL ME AT HOME 532 3810 TONIGHT OR DAYTIME 532
P1240812	IT WOULD SLIDE BY ITSELF.....
P1593983	LL BE PRAYING FOR..
P1872544	CALL ME AT THE HOUSE WHEN U GET A CHANCE/COURTNEY
P1670155	#778 14:34:00
P1465945	396-1044-3628757
P0838933	CALL ME AT MY HOUSE RIGHT A WAY.
P1535995	17: BILL GALLINARO 603 598 0140 RE: WORK
P0838519	8465428
P1491585	3761925
P1144047	HEHEHEHEHEHE..HOW ABOUT A BASKETBALL
P1556681 <E>	HOW IS YOUR COLD?
P1465736 <E>	SHIRT!!!!! THEY
P1890725	E] renF111g f.DI
P1517256	5622569911911911256991 1
P0067072	wisk unscentedVK
P1466559	E 508 289 7245 RE AN ADD IN THE PAPER ABOUT FURNISHED
P1567292	85 A WK
P1246287	ouble page again on its own.
P1022536 <E>	HELLO CLAUDIA THIS IS DONNA HAPPY HOLIDAYS!! NOW KEN!
P0803247	JUDY MANION 252 4333
P1872157	PLEASE FIND OUT IF THE SCOUTS ARE STILL SELLING TREES, BABCI WANTS TO KNOW...
P1309417	SH CRISIS TEAM X4550 P/C

Computers

Probe Version 2.0 Beta

Controls the Optoelectronic's Optoscan board. Computer scanning at it's best!

by Lonnie Gorsline

Welcome to the second in a series of articles about software that can be used to control the Optoelectronics OS-456 and OS-535 boards. As you may or may not know, Probe was developed exclusively for the Optoelectronics Optoscan boards, to fully exploit and focus on their capabilities without having to be concerned with the support of other radios. This is a big advantage to us Optoscannists. So let's see what the advantages are.

The first thing is that you can run it on almost any DOS-based computer. That means if you have an old 8088 computer lying around not doing anything, you would be able to use the program. DOS was that operating system we all used to use. But even with Windows 95 out and still lots of people using Windows 3.1 or 3.11 for Workgroups, it doesn't mean you're out of the picture. I have Probe running in a window in the background, chugging away without any problem. I'm currently running Windows 95 on a 486 DX66. It's not that the developer has anything against Windows, it's just that he thought you should have the option of running it on any computer you wanted.

The program comes on a 31/2" disk, along with a operators manual and information on getting up and running quickly. Installing the program is a cinch. Just put the disk into the drive and type "INSTALL C" if you want it on your C drive. It will create a sub-directory called Probe for you. If you prefer, you can install it in what ever sub-directory you want by typing "INSTALL C (whatever the name of the directory is)" and press Enter. That's all there is to it.

After you have installed the program, you need to configure it to your radio. All that is needed is to identify what COM port your radio is connected to and what baud rate you want to use. The default is COM 1 at 9600 Baud. You can go up as high as 19,200, but more on that later. The I/O address and IRQ settings will automatically be set when you select the COM port.

When you have all of that set up you're ready to start entering your frequencies for scanning. Before we get into that we need to go over a term first. This will make it easier for you to understand what I'm talking about. The expression you need to know is "GROUP." A Group is one of 4000 user-configurable files, each containing up to 99 Banks with up to 1000 Frequencies. Think of a Group as almost like another scanner that has Banks and Frequencies. You could also use a Group file as a Work Group. What I mean by that is, you could copy information from your main group to the work group that you can then change and play with, without messing up the one you like.

When you first install Probe there will be one Group in your list of Groups labeled as the Default Group. From here you can create new ones. When you go about creating a New Group, you highlight the Default Group and select the Add function. The program will ask if you want to copy the configuration information from the Default Group to the New Group. You must select Yes or your attempt will abort. After you have selected Yes, another window will come up showing items you can copy over to the New Group. You can toggle them on and off by pressing the space bar. Once you have selected which ones to copy over, just press Enter. If you don't select any of them the files will still be created, but there will be nothing in them, which is fine because you can enter the information later.

If you were going to create a Work Group like I mentioned, just select all of the information in the window and you will have a duplicate of the Group.

Now that you have made your first Group it's time to enter your frequency information. It can be done in one of two ways. The first one is to type the information in by hand. Second you can import the information from a CD ROM FCC file, like those sold by Percon. Since were talking about importing information from a CD ROM, I might as well mention how easy it can be done.

From the Utilities menu, select the "Import FCC Data File." Just answer the questions asked. One of the things I think is really cool is that the program can put each Service Code description in a different Bank. When you begin scanning you can select just the radio service, or services, you want to scan, such as police and fire.

It's also very easy to enter the information manually. From the Configuration menu select "Frequencies." If the group you have created is a new one with no frequency information in it you will see a blank screen. In this screen just select the "A" for add and the input information window will come up. Just enter the data you have into each slot. If you don't have the particular information, just press Enter and continue on. Do this for each frequency until you're done.

While you're entering all of this information you will come across a prompt that asks you for a "SmartBank." So what is a SmartBank, you ask? A SmartBank is a bank (any of the 99 Banks) that you can set aside to store frequencies that you don't scan all of the time, except for special occasions. For example, say you have a Red Cross frequency in a normal bank that will only become active when something big is happening. When that frequency becomes active you can then lock in your FEMA Bank. With the SmartBank feature, when that Red Cross frequency becomes active, it will automatically have the other Bank become part of the existing scanning group. Some people like to call this "Focused Scanning." That's not the only thing you can do with the SmartBank. You can set it up to be to be Exclusive or Non-exclusive. What that means is that if you want to con-

tinue scanning the other Banks while at the same time scanning your SmartBank, then you would want it to be Non-exclusive. Exclusive would be, of course, to scan just that one Bank and no others. Another setting for SmartBank is that you can have it automatically turn itself off if there is no activity within a certain amount of time. That time is up to you, as long or as short you want it to be.

Once you have all the information in the Bank you will see that the once-blank screen is now full of the information you provided. Notice that all frequencies are sorted in frequency order no matter what order you put them in. Also, you should note that there are no channel numbers. There really is no need for them as each frequency is identified by the user.

While we are still on this subject, there is another great feature. If you move the Highlight bar, or cursor-whatever you want to call it, the radio will tune to that frequency. This is a great way to manually tune through frequencies.

Now is the time you can start scanning. To get there just hit the ESC key until you get to the main menu and select "S" for scan. Now that you're in the scanning screen you can see that Probe gives you a lot of information as to what frequency is being used and who it belongs to. Here is a list of what is displayed and what they are for:

Status–This indicates what the status of the scanner is at any given time. It will show ACTIVE, DELAY, PAUSED, or INACTIVE

MHz –This tells you what your current receive frequency is, or what the last active frequency was. Also the "z" will become a capital "Z" when there is modulation on the frequency

CTCSS/DCS–This indicates to you the tone or DCS code that is currently being monitored, or the last active tone or DCS code

Signal–This indicates your received signal strength. It can be displayed as either a bar graph or dBm number. If you're using Signal Squelch, then it will display "SQUELCHED"

Mode–This indicates the current or last active mode that was used, i.e., NFM, WFM, and AM

Priority–This indicates if the Priority Bank is on or off

Alarm–This indicates if there was an alarm set on a certain frequency and what the alarm setting is

Log–This tells you if the log function is on

Recorder–This shows whether the recorder will record your frequency when it becomes active

Delay–This indicates if there is a delay set and for how long it is set. After a station is done transmitting the counter will count down until "0" before it begins scanning again. This, of course, depends on how long you have the Delay set for, if at all

Active–This indicates how long a station has been on the air. It shows this information for either the current frequency being monitored or the last active frequency

Group–This tells you the name of the Group that your scanning

Bank–This is the Bank you are currently scanning. This changes as the scanner is scanning through the Banks. As you're scanning the Bank, the number of "Unlocked" frequencies for that Bank is displayed

Log–Shows the name of the Log file currently being used

DTMF–This shows any DTMF data if any have been sent. The maximum number of characters on the screen at one time is fifty. If there are more than that sent the oldest characters are scrolled off the screen

FCC–License Data

Licensee–Name of licensee

Service–Radio Service Code and Description

Address–Licensee, or Transmitter street address

City and State–City and State where the Transmitter is located

County–County in which the Transmitter is located.

Callsign–Licensee Call sign

Latitude–Latitude of Transmitter.

Longitude– Longitude of Transmitter

Distance–Distance from Monitor to Transmitter, only if location has been filled out

Latest Activity–This is the area of the screen that shows what the activity has been. The newest active frequency at the top with the oldest at the bottom. It shows the Frequency, Tone, Name, "R" if it was recorded, "L" if it was logged, Time, and Hit count. The hit count only works if you have the Log function on.

The Tone Squelch is one of the nice features of this program that is done really well. In fact, I have yet to see a program that does it as well. For those of you who may not know what this is, it's a way of only hearing a frequency that is transmitting a certain PL (Private Line) Tone. So what is so special about Probe in this respect? Other programs I've tried stop for a split second to check the channel to see if it's transmitting the correct tone to open the squelch. If it's not, it continues on. The problem with other programs is that you can hear it stop and check. With Probe, you can't tell it's stopping. What if you have two users using the same frequency on different tones? What if you want to hear them both? Not a problem. Just enter both users, using the same frequency but different tones, into different records. Then you're just going to check the same frequency twice, right? Wrong, Probe is smart enough that it only checks the frequency once, but checks both tones. Whichever tone it finds transmitting, it will stop on the frequency and display the record for that tone. Not only will Probe stop on a frequency that has the correct tone, but while on that frequency it will close the squelch if another user starts transmitting using a different tone and continue to scan. Pretty cool huh!

While in the scanning screen you also have controls to give you instant access to different parts of the program.

They are as follows:

[B]ank–This will give you instant access to your Bank listing

[F]req–This gives you instant access to your frequency listing

[E]dit–When you are stopped on a frequency you can then go directly into the edit mode and change or add any information to that record

[R]ecord–This key will turn on the record option

[V]iewlog–This will bring up the log file if you have had the log function on.

[K]illtemp–If you have any temporally locked-out frequencies, this will unlock them

[S]ettings–This will take you directly to your setting's menu. You can then make any changes and escape back to the scanning screen

[M]anual–This key will allow you to manually tune the radio to whatever frequency you want. You can also step up or down in frequency a certain amount depending on what the step rate is.

When the scanner has stopped on a frequency you have some additional controls available.

They are as follows:

[L]ockout–This will allow you to lock out the currently active frequency

[T]emploc–This is when you just want to temporally lock out a frequency for what ever duration of time you have set

Lo[g]–This key allows you to log the active frequency. Think of it as a manual log function

ESC–The escape key, like in the rest of the program, is used to take you out of the particular screen you're in, or to cancel an operation you may be trying to do

ENTER–The Enter key puts the scanner on pause so as not to scan until the Space bar is pressed

SPACE–The Space bar as indicated above will cause the scanner to continue scanning...

Do you notice something here? The commands to get you to different parts of the program are real easy to remember. Most of the commands are the first letter of the command name. Makes it simple!

Not only can you scan frequencies of your choosing, but you can also do searches between a range of frequencies. To get started select "Create Search File" from the utilities menu. Just input the information. You can put your search file in with your standard scan file, and it will be treated like a Bank. If you want to search that range, just select that Bank. I prefer to make a separate Group and put all my search files in that Group. It's all up to you. That's what's so great about this program. Think of it as a tool box full of tools and all you need to do is use them. Use your imagination. How I use them will most likely not be the same as you would.

When you have your search file entered, the program will enter each frequency into a file just as if you entered them yourself. Make sure that you have the correct beginning and ending frequencies and the correct step rate. If you don't, then the proper frequencies won't be searched. If you have all that set up correctly, you can go back to the scanning screen and start searching that range.

Conclusion

Here is a DOS-based program whose sole basis for existing is better performance for the Optoscannist! You can get that performance using almost any type of computer. This can range from an HP Palmtop to the latest computer out there.

Your scanning speed will vary, of course, with the type of computer you're using, but even using one of the slowest PC's out there, Probe will outperform many other programs using faster computers. One reason for this is that Probe takes full advantage of OptoScans "Pipeline Tuning." As far as I know, Probe is the only DOS-based program that incorporates this type of tuning. I did some testing of the scanning speed of Probe and this is what I found. Stock off of the disk, using default settings, I was able to get 48 channels per second on my 486 DX66 computer using 9600 baud rate. Now, by experimenting with the settling time (speed command), still using the 9600 baud rate I was able to get it to 55 channels per second without it skipping any channels. The danger is that if your settling time is too low, the radio doesn't have time to check the frequency and stop. I'm told by the programmer that if you play with that a little you can still get your speed up, if you don't mind the radio skipping over some of the weaker signals. If you really want to make the scanner fly, try using the program at 19,200 baud. Be aware, however, that the OptoScan OS-456 was not designed to work at 19.2 and doesn't perform quite as well as the OS-535, although 60+ frequencies per second have been reported by the developer. At a baud rate of 19,200, and playing with the settling time, I was able to get clear up to 120 channels per second! Remember, the stock speed of a PRO-2035 is 50 channels per second. That's quite a jump in speed. It seems that since the baud rate is up, I can take the settling time down, and up goes the speed! I was concerned that at that speed I would start skipping channels. So I did another experiment. I had one scanner scanning the same frequencies as the PRO-2035 using Probe. I found that I only missed one call in a period of 30 minutes. So I will let you make up your own mind.

The program is laid out very well and is very easy to use. The commands are very easy to remember because of the mnemonic use of the keyboard commands. With its advanced use of tones, anyone in an area that has intermod will benefit tremendously. Probe will also do Signal Squelch. This allows you to tell the radio not to open the squelch below a certain signal threshold.

There are only two things I can really say against the Probe software. The first one is we are becoming a graphical world. Computer users are going to Windows operating systems more and more-including me. If you want to take full advantage of the program, you will want to dedicate a computer of it's own to the task. If you're really into scanning and know just how much benefit there is to using a computer to control a scanner, you will have no problem with it. Probe will, however, run in Windows. In fact, I'm running it in Windows 95 without any problems whatsoever. I've been running it in a DOS window and have it minimized on the task bar and it seems to work just fine. The only problem is that you can't see what frequency is currently active and what the status might be at any given time. You don't need a fancy computer for the program to perform. We've already discussed that. Some of the older computers can be bought at a very reasonable price. Just the other day I saw a 386 DX40 with monitor for $500.00. I'm sure you could get a 286 or 8088 computer for almost nothing. In fact I just gave away a 8088 computer with monitor. So there!

The other gripe is the fact that you can only import from an FCC data file, like the ones used from the Percon CD ROM. It would be nice to be able to import from any ASCII file. Mine is just a Beta version and who knows what DataFile will come up with. One thing to be aware of-this program is a new-and- improved version of the Probe most of us have heard about. There are over 70 new additions and enhancements over the previous version. The final version should be released by the time this article goes to press. The developer will be sending out upgrade notices at the end of January and will be shipping by mid-February.

I'm sorry I didn't have the room to cover all of the features of the program, there are just too many. I don't think you can go wrong by buying this program, if you don't mind it being a DOS program. DOS does have its advantages.

This program does everything the author says it does. I rate it at 3 & 3/4 stars out of 4. For more information, contact:
DataFile Inc., P.O. Box 20111, St. Louis, Missouri 63123
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Public Safety Communications

Fireground Radio Operations

Advanced fire scanner buffs know the real meat and potatoes of fire fighting can be monitored on fireground frequencies.

by Ed Muro

One integral part of the fire radio communications system that is often overlooked by the monitoring enthusiast is the fireground radio operations system. Most hobbyists just program the fire department dispatch frequency into their scanner and that's it. Advanced fire scanner buffs know that the real meat and potatoes of fire fighting can be monitored on the fireground frequencies. The problem that arises is that these communications are usually low power transmissions and you need to be close to the scene of the fire to receive these communications.

Depending upon the needs of the community, there can be many different system setups. Some larger departments use their repeater output or input frequency in the simplex mode for fireground operations. In my community, the county has a countywide low-band system set up for dispatching and battalion use. When a call comes in, pager tones are broadcast and the units are dispatched on 46.100. When the trucks roll, they tune their radios to the battalion frequency of 46.200, where the department and county dispatchers monitor for additional requests for apparatus or mutual aid. When the units are on the scene, the hand held receivers needed to operate on low band would be too large in size. In the case of the Hewlett Fire Department, their personnel are equipped with small, low powered UHF portables operating on 465.6125. These radios transmit to a cross band repeater located in the fire truck which re-broadcasts the transmission on 46.200. When the mobile extender is in use, all transmissions on 46.200 are re-broadcast on the UHF frequency. (460.6125 is also used by the Paterson, New Jersey Fire Department, with a squelch tone of 162.200.)

Fireground Frequencies Around The Nation

New York City Fire Dept.
F-1: 153.830
F-2: 154.430
F-3: 153.770
F-4: 154.010
F-5: 153.950
F-6: 154.070
Fire Marshals 450.5750
High Rise Cross-Band repeater 460.625 \ 154.430

Atlanta Georgia, F.D.
(From Barry Mulligan)

Dispatch 154.190
Fireground (Ch-3) 153.830

Atlanta has just installed a trunked system and is simulcasting on 800 MHz. A full changeover may be made in the near future.

Birmingham, Alabama, F.D.

154.190—Primary dispatch
155.340—Secondary communications
154.130—Fireground
154.235

Boston Fireground Frequencies:

F-2 483.1875 Fireground
F-3 486.2125 Fireground
F-4 486.2375
Command, Fireground, Fire Alarm, Const.
F-13 483.2875
Metrofire bases (Mutual Aid Radio)
483.3125 Metrofire Mobiles

Los Angeles City:
(Donated by someone who knows)

858.2375, 857.4375, 856.4375, 859.7625, 858,7625, 857.7625, 856.7625 MHz, plus the five mutual aid channels

Another interesting frequency that seems to come in well in the New York Metro area is the Stamford, Connecticut Fire Department on a frequency of 154.130.

Mailbag

Ben Farda, Jr. writes in with three questions regarding APCO 25:

I have read a number of articles lately in several communications magazines that claim in the future public safety communications will be digital in nature. How long before the changeover takes place? Will scanners be available in the future to receive digital transmissions and how much will they cost?

Well, Ben, that's a very good question. APCO is promoting a standardized digital protocol for public safety communications. This would be different because it is only a protocol, unlike trunked systems where Motorola and GE Erricson own the rights to the protocol and the software. It is safe to assume that there will be scanners available to receive these digital communications. Unfortunately, at this time there is no idea of pricing. Due to the costs involved, the changeover will

most likely be slow and take at least ten years.

Dave Puro of Caldwell, New Jersey submits:

Essex County, NJ Highway Dept 151.310 & 159.315. Extremely active during snowstorms.
Criger Towing of Fairfield, NJ 150.815
Essex County Sheriff's Dept. 471.3625
Essex County Jail Annex in North Caldwell 45.18
From a letter I received in 1980 from Bob Grove:
Dear Eddie:
I think your report of reception of 439.000 is actually an image of 417.400, assuming you have a Bearcat Scanner. The Department of Justice (DEA & FBI) use that as one side of a repeater in New York City. Since the paired frequency is reported to be 419.000, you might try picking up the image on 440.600
Best Wishes...Bob
Now that was a blast from the past.

A member of Scanning Anonymous submits the following for the Seattle Airport:

SEA-TAC Airport fire	453.300
SEA-TAC Airport fire	453.400
SEA-TAC Airport police	453.200

Finally, Ed Ashley of Augusta, Georgia reports:

The Columbia County Sheriff's Department is jumping on the Internet bandwagon by creating it's own homepage on the world wide web (www) in order to reach citizens and communicate with other law enforcement agencies.

According to Captain Michael Tomberlin "This is going to be a great way to communicate with the public in a cost efficient manner." "It will also allow us to exchange ideas with other agencies around the country."

The page will have several different sections to access and will cost the department about thirty-five dollars a month. They plan on asking citizens to volunteer to help update the page on a regular basis.

Other agencies on the Web include the F.B.I. The F.B.I. homepage can be accessed at:

http://www.fbi.gov.toplist.htm

Don't forget to check out my homepage at:

http://home.aol.com/ny041ed

F.D.N.Y. Code 5-5-5-5; It is with deep regret to announce the passing of Lieutenant John M. Clancy, age 35, of Ladder 127, Battalion 50. He succumbed to injuries sustained fighting 22-6066 at 97 Ave. 149 Street; Dec 31,1995. Our prayers go out to his family. It is unfortunate that this brave young man gave his life for what is now being investigated as an arson fire.

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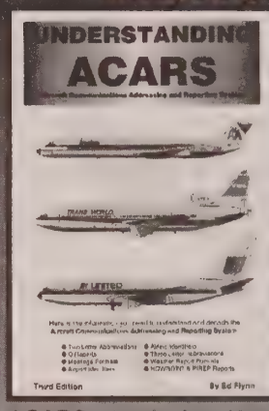

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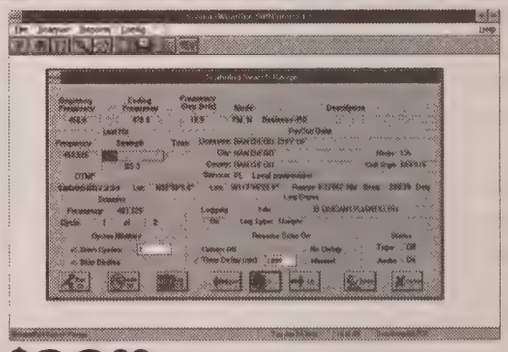

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Space Communications

SpaceQuest

Listening to the Space Shuttle and MIR Space Station. Where to find the frequencies.

by Donald E. Dickerson, N9CUE

You may be looking for a comprehensive list of space frequencies. You may want to know how you can hear simulcast Shuttle audio. If so, you are not alone. I received a very nice letter from Eric Brandon of Georgia recently. Along with some nice comments about US Scanner News, our Space Communications column and the article on Space Antennas we recently ran, Eric requested more frequencies on Shuttles, spacecraft and anything else that might be floating around up there, which I will provide. He further states, I am glad to say, that he has already had luck picking up the Mir space station and the Shuttle on 142.600, 143.625 and 145.550 MHz. The latter is the voice frequency for the Amateur Radio transmissions from both the Shuttle and Mir. Mir also uses this frequency for Packet (data) transmissions. My most recent catch from Mir was on the 7th and 8th of January when two different cosmonauts were heard on 145.550 MHz. One was DP0MIR, the second was Yuri, whose call sign I forget at the moment. If you are an Amateur Radio operator, don't be bashful. If you hear the packet from Mir on 145.550 MHz, call them and see if you get a response. Few DX catches will excite you more.

Eric also mentioned that he listens to 146.550, 146.760 or 147.345 MHz in the Atlanta area when a shuttle flight is up, as they simulcast shuttle audio on those local FM repeaters. So I will include a list of Amateur Radio repeaters located throughout the country which provide this service. I may also suggest a couple of books that can assist you in your Space Quest.

Before we look at the frequencies, however, I would like to take a couple moments to answer some of Eric's questions about his station. He has noticed some unusual behavior in his station among the antennas and thinks he may have a mutiny on his hands. Eric owns Bearcat and Radio Shack scanners. With these he is satisfied with his frequency coverage but has noticed that he sometimes has better results listening to space communications on his whip antenna rather than his outside antennas. He has two multi-band ground plane antennas, both from Radio Shack. What gives?

Certainty is something we may not find on this one, Eric, but I can suggest a couple possibilities. First, when you are listening, say to the Mir space station on just a whip antenna, the signal may sound better because it is stronger. That is, you will not hear the space station on a whip antenna until the signal is quite strong. This means the station has enough height to have a good line of site directly to your whip antenna on the back of your scanner, thus the stronger sounding signal. Your outside antennas will pick up weak or marginal signals. They will be noisy as the space station is almost out of range of your station. Of course, on a close pass the signal from Mir should be considerably improved. If it is not, there are a couple of reasons this might be true. First, you could be using an inferior brand of coax cable. I suggest you buy the best coax you can afford on your budget. I recommend Belden brand. Type 9913, or similar, is about the best you can get. Another suggestion is to keep the coax as short as possible, well under 100 feet. If not you may need to add a preamp to your system. A third possibility is a cold solder joint in the coax connectors. You need good connections to keep from losing large amounts of signal. This condition could cause the problem you described, Eric. You also mentioned that you use a wide-band amplifier. These can work great or not so well depending on the frequencies you are tuned to and the amount of noise on the signal. Use the amp selectively. See whether the signal you are tuned to is better with or without the amp. If the signal-to-noise ratio is unacceptable the amp will be introducing too much noise into the receiver and should be turned off for the time being. The amp could also worsen the effects of a cold solder joint or leaky coax problem.

A second problem had to do with hearing French TV audio on a frequency of 165.345 MHz. Though I don't know what service uses this frequency in your area (part of the federal government band) I can probably assume you don't have too many French TV stations in Georgia. This is most likely an image problem or leaky cable TV service. If it is the former there is not a great deal you can do about it, though I have a couple of suggestions for you. First, you must realize that most scanners have "weak front-ends." This means the first circuits inside your scanner are not designed very well. This is a long standing tradition within the consumer scanner industry. (Don't ask me to explain that

one.) Just as peculiar is the fact that early CB radios were designed with excellent receivers and this tradition has been followed by companies that make both types of equipment. Some things just can't be explained, not logically at least. The first circuits in the scanner are those which select the frequencies which will be passed on to other circuits for amplification, etc. This reason alone contributes to the weak front-ends, because additional and expensive filtering would be necessary to prevent you from hearing images and leaky cable TV channels. Images can also be heard from many other services than the ones assigned to a particular frequency. It's a common problem. For example I have 436.800 MHz programmed in my scanner to try to catch a satellite launched by Portugal. Instead of the spacecraft, I usually hear the Federal Protective Service which uses 415.200 MHz. You will find most scanners suffer from images, as well as birdies, which is simply a heterodyne or single tone squeal due to poor design. It is just something you have to learn to live with.

There are a couple of thing you can do about these irritating problems. The easiest is: don't use an outside antenna, especially if you live in a metropolitan area, unless you want to chase lowband military, DX, aeronautical stations or signals from space. If you do, then you put up with it and get used to changing your antenna configuration to fit the frequency bands you are scanning.

We will finish up with Eric's last question about which antennas are best for space communication. I think this goes back to two things, your interest and budget. Any outside antenna is better than no outside antenna if you are going to hunt the most exotic signals. A good beam antenna pointed at an upward angle of between 30 to 45% can effectively be used for geo-stationary satellites, as can a discone antenna with a preamp. It depends on your interest and budget.

One last suggestion before we close. There are a couple of companies that offer scanner filters which will only pass the standard scanner frequencies and have good rejection. These could be tried by themselves or in conjunction with a preamp. For example, you could use an outside antenna, run the coax through a filter to clean it up a bit and then run it through your preamp. This might even improve your signal-to-noise ratios.

Though I normally do not endorse products, you asked about the best antennas for scanners. If you meant for space communications, you need to look at this and the article on space antennas. The only antennas I have heard exceptional things about consistently over the years has been a couple of the Austin brand antennas. These comments have been from scanner operators who were *NOT* using them for Space communications and I have not had any personal experience with them. Their number is (603) 335-6339.

I also promised to tell you about a few books with exhaustive space frequency listings. They are all written by the same person, Tony Curtis (K3RXK) and they are all published by Tiare Publications, PO Box 493, Lake Geneva, Wisconsin 53147. Since we are talking about the space shuttle and Mir I will mention MONITORING NASA COMMUNICATIONS first. It contains all of NASA HF, VHF, UHF and satellite frequencies. The HAMSAT HANDBOOK will tell you everything you ever wanted to know about Amateur Radio Satellites. WEATHER RADIO will tell you about weather satellites as well as VHF weather radio stations and much more. I found it fascinating. Tony's fourth book is a frequency directory simply called THE OUTER SPACE FREQUENCY DIRECTORY. All these books are designed with the steely-eyed space man in mind.

I hope our little outing has been helpful. And like Eric, let me know what you are hearing and what you need to know to make life a little easier around your radio shack....till next time. **USSN**

LIVE SHUTTLE RADIO

Alabama	
Birmingham	145.150 / 145.380
Huntsville	145.100 / 147.100
California	
Los Angeles	145.320 / 145.460
Mountain View	145.580
Oxnard	146.655
Ventura	146.655
Sacramento	145.580 / 147.195
San Francisco	145.580
Florida	
Cape Canaveral	146.940
Ft. Pierce	145.130
Jacksonville	147.120
Vero Beach	145.130
Georgia	
Ashburn	147.285
Atlanta	146.655 / 147.345
Forsyth	147.915
Iowa	
Cedar Rapids	146.400
Illinois	
Chicago	145.210
Downers Grove	145.350
Maine	
Portland	146.925
Maryland	
Greenbelt	147.450
Minnesota	
Minneapolis	145.120 / 145.150
St. Paul	145.120 / 145.150
Waseca	145.450
Ohio	
Dayton	145.210
Greenville	146.790
Texas	
Dallas	145.310 / 146.600
Ft. Worth	145.310 / 146.600
Houston	146.640
New York	
Albany	146.820
Wisconsin	
Wausau	146.820 / 147.060
D.C.	
Washington,	147.450

(This is a sample list of frequencies from the Outer Space Frequency Directory)

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Book Review

Monitor America

Bigger and better, with over 1100 pages packed with frequencies.

by Jim Marquand

It has been over ten years since the first edition of "Monitor America" was edited by Richard Prelinger and Daria Malinchak. It had slightly over 600 pages and was the first attempt to publish a single, national communications manual. The first edition covered all fifty states. Most state agencies were included, from state police and highway departments to colleges and universities. Over 40 major metropolitan areas were also included, plus special sections on sports and amusement parks, and the news media, as well as the usual police, fire and EMS material.

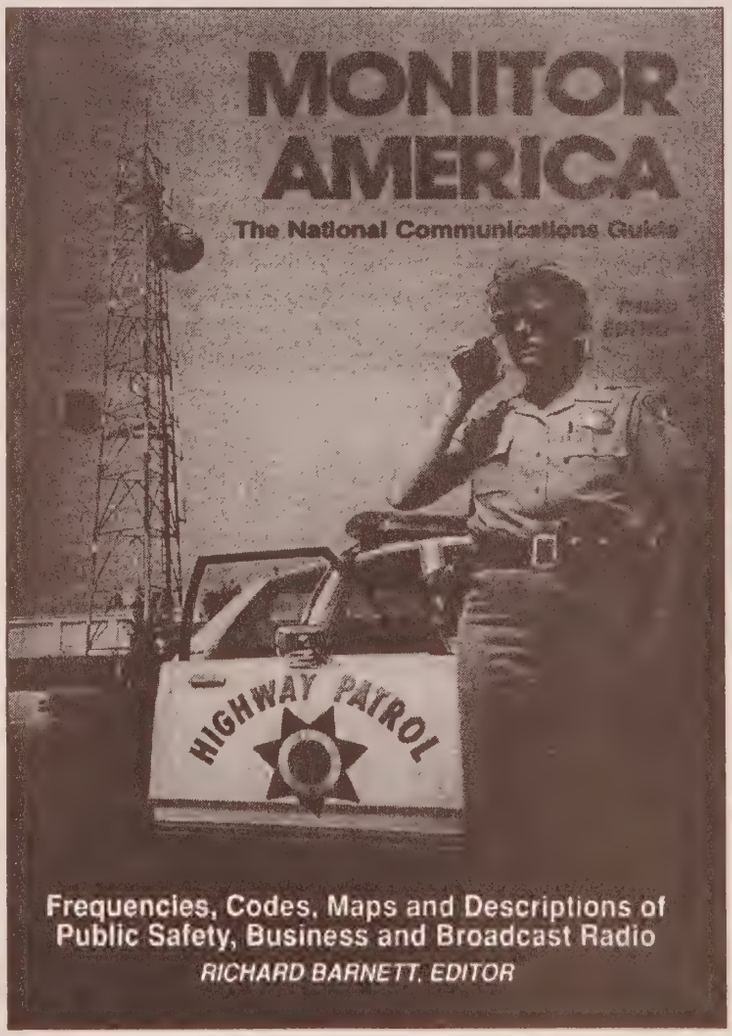
If you were going to travel to almost any major city in the United States, you could take along this single frequency manual and look up the basic frequencies of interest. This was a really great idea. You may well be the world's expert on your local area, but drive about 100 miles down the highway, and without a good reference, you can probably only pick up the local NOAA weather and the McDonalds drive-up window. You will then either have to put your scanner into Search or head to the nearest Radio Shack for a copy of the local frequency list they give out when they sell a scanner.

Until 1992, I carried "Monitor America" with me on trips away from home. That year, the 822-page second edition of "Monitor America" was published. This time it was edited by Richard Barnett, who had published the first edition. This new edition contained information on 250 metropolitan areas. It also had additional sections on railroads, military, aviation, air traffic control centers, race teams and tracks. It also had some shortwave radio & some federal and military frequencies. Most information contained in the first edition was included in the second edition. Not included in the second edition were sections on "survival guide," "frequency allocations," distance-chart for milage between major cities, monitoring laws of various states or interstate highway maps and time zone charts. This time the book was starting to get quite thick and I guess they decided to stick to more frequency data and less filler material.

Early in 1995 I began hearing rumors that the third edition was soon to be published. Of course I called SMB publishing and ordered a copy. It was to be published in about July. A few months later I called and was told that it was still in the works but would soon be out. Finally, on the last possible postal delivery day before Christmas, I heard the mailman honk at my mailbox and it was finally here. No wonder the mailman honked. This third edition is over 1120 pages thick! It wouldn't fit in the mail box with its packaging.

Off came the wrapping like a large bug coming out of it's cocoon. What a handful. Upon opening the cover I saw that this edition now had three editors. The main editor is still Richard Barnett, with William Cobb and Edward Soomre as assistant editors.

The end of each state listing,of the new edition now contains a "county/community sort," which covers almost every city police, fire, local government frequency. I did notice some



of the 800 MHz trunked government systems in my local area not included that have been on the air for at least 3 years, so I can only assume the same may be missing from other areas.

Included in this third edition are CTCSS/DCS (PL/DPL) tone codes, when known, and lists of AM and FM radio stations with their call letters, location, frequency and format. Some other new features include an updated nationwide itinerant list, FCC frequency allocation table, national area code & time zone map, 800-number travel-related listings and, of course, a complete update of the previous edition.

In addition to the new third edition of "Monitor America" you can order "by state" booklets for each state covered in the big book. These are copies of only the material covered for each state without all the nationwide material, federal, military, shortwave, and all the other material which applies to all the other states.

I ordered a "by state" copy for my state and it comes with only a photocopied paper cover, like the pages, so you may want to put some protective covering over it if you plan to use it much.

I guess it will probably take me from now until I hear about the rumors of the fourth edition release to read through the third edition. It is true that not every frequency in every area is included in this edition. If you want every frequency for a specific area you will need to purchase the "frequency almanac" for your state of interest or one of the CD rom or disks available from other sources.

Congratulations to all those associated with this new "Third Edition" of "Monitor America." I give it 3 1/2 star rating and highly recommend you add it to your collection of communications reference material.

"Monitor America - 3rd edition" is available from:

Scanner Master
PO Box 428
Newton Highlands, MA 02161
or call (800) 722-6701

for $29.95 plus S&H

"By State" editions for $5.95 to $9.95 plus S&H.

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FCC News

Mobile Satellite Service

The FCC proposes yet another Mobile Satellite Service.

by The USSN Staff

The FCC has released a Notice of Proposed Rule Making that would create another Mobile Satellite Service (MSS), this one at 2000 to 2200 MHz.

The 1992 World Administrative Radio Conference allocated the band at 1980 to 2010 MHz for MSS (Earth-to-space) and 2170 to 2200 MHz for space-to-Earth use worldwide. In this hemisphere, the bands at 1970 to 1980 MHz for Earth-to-space and 2160 to 2170 MHz for space-to-Earth were allocated. In 1994, the FCC allocated most of the band at 1850 to 1990 MHz for the new Personal Communications Service. They placed the segment at 1970 to 1990 MHz into reserve for future PCS use, with an eye toward possible MSS use, but stated at that time that it would be impractical to allocate spectrum in that band since it would be inconsistent with the worldwide allocation. They were also hesitant to take any spectrum away from the new Personal communications Service, which they figured would see greater use than a Mobile Satellite Service. They did state, however, that they would consider an MSS allocation in whatever compatible spectrum they could find, especially since such a service could see use in remote or lightly populated areas.

In December 1993 TRW had filed a petition that requested the allocation of the 1970 to 2010 MHz and 2160 to 2200 MHz bands for the provision of international MSS by satellites in non-geostationary orbits. TRW stated that these bands are the only bands suitable for global MSS voice-grade service via hand-held transceivers that are allocated internationally for MSS and not applied for in the United States. They proposed a twelve-satellite constellation that would provide virtually global coverage. In February of 1992 Celsat filed a petition for rulemaking which requested the allocation of the 1970 to 1990 band on a shared basis with PCS and the 2160 to 2180 MHz band for a hybrid MSS/terrestrial personal communications service.

In April of 1994 Personal Communications Satellite Corporation, a subsidiary of American Mobile Satellite Corporation, filed a petition to allocate the 1970 to 1990 MHz and 2160 to 2180 MHz bands for a geostationary Mobile Satellite Service that would also be compatible with the Personal Communications Service.

In light of this demand, the FCC is proposing to allocate the bands at 1990 to 2025 MHz for Earth-to-space and 2165 to 2200 MHz for space-to-Earth links in the Mobile Satellite Service. The service could be used by either geostationary or non-geostationary orbit satellite systems. They state, "There is significant consumer demand for convenient mobile services such as telephone, high-speed data and fax and video. MSS can provide such communications in remote or rural areas not covered by terrestrially based mobile services and can provide nationwide public safety coverage. MSS could satisfy important requirements that cannot be economically satisfied by other means."

The 1990 to 2025 MHz band is part of the 1990 to 2110 MHz band that is currently allocated to the Broadcast Auxiliary services (BAS), mainly ENG (Electronic News Gathering) use. If the new MSS allocation is made, the FCC is proposing to add 35 MHz at the upper end of this band to accommodate the existing BAS users. This would extend the Broadcast Auxiliary allocation to 2145 MHz, into spectrum allocated for future PCS use and currently used for fixed, point-to-point use. Under this proposal, MSS licensees would have to pay the cost of relocating Broadcast users to the higher spectrum.

The band at 2165 to 2200 MHz is the other band originally allocated for PCS but later placed in reserve for future use. This band is also used by both Private and Common Carrier Fixed users. Any relocation costs of existing users would have to be borne by the MSS providers.

It is interesting that the FCC would propose the creation of yet another Mobile Satellite Service. There has been an allocation for maritime and land mobile satellite service at 1500 MHz for years and only relatively recently a new allocation was made for a non-geostationary MSS service at 1.6 GHz. And in their report on the state of the Commercial Mobile Radio Services (see last months FCC column), the Mobile Satellite services were noted to have seen the least amount of use of all the CMRS services, mainly due to their relatively high user cost. **USSN**

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Internet

Using Usenet

Usenet is a bulletin board for the entire world. Almost anything is available and it's growing rapidly.

by Steve Baker

Are you looking to buy a new or used scanner? I have two words for you, SWAP MEET. You never know what you will find at a swap meet; old radios,new radios, military issue, or the scanner you have been wanting at the price you can afford. It's fun to visit these meets, sometimes making them into a weekend trip. What if you don't have the time to visit one of these meets?

There is a huge swap meet going on right now that you don't have to pack your bags for. People from all over the country, and the world, are meeting there. This place is open twenty-four hours a day, seven days a week and it might be taking place in your home. It's called USENET. If you have access to America Online, Compuserve, Delphi, Prodigy, or almost any Internet provider, you will have access to Usenet.

Usenet is a bulletin board for the entire world. There are thousands of different discussion groups on topics ranging from science to politics, from business to sex, from jobs to scanners. You can post messages, read replies and browse through the thousands of messages that are posted every day. Even though USENET is closely related to the Internet and lot of its traffic travels over the Internet, USENET is not the Internet. If you have access to any of the major online services or Internet providers you will have access to USENET.

According to Nielsen Media Research, the people who do the famous Nielsen TV ratings, approximately 37-million people in the U.S. and Canada have access to the Net-either directly or through a friend, at work or through a commercial online service like CompuServe, Prodigy or America Online. Scanning enthusiasts are among these millions, and they are using it to enhance their hobby.

Mike MacMullen, a Prodigy subscriber and scanner enthusiast from Batavia, Illinois says that, "I have used USENET groups rec.radio.scanner & alt.radio.scanner to post questions. I usually get some sort of answer. It is a great exchange of ideas."

Rec.radio.scanner, alt.radio.scanner and rec.radio.swap collectively contain about 200 new messages a day. These groups are somewhat similar, but are different enough to warrant separate newsgroup names. Let's look at the purpose and use of each of these newsgroups.

REC.RADIO.SCANNER & ALT.RADIO.SCANNER

These two groups serve as discussion forums for scanner hobbyists. They are similar, and both popular, but the REC group gets about twice as many messages a day thru the ALT group does. Frequencies, Web page announcements, scanner discussions and news are posted on these groups. Many knowledgeable people are on these groups, and they are happy to share information with new users.

"While there is often a lot of information, you must be willing to sort through a lot of unwanted or poorly conceived information," says Michael Alexander, the author of The Underground Guide to Computer Security, published by Addison-Wesley Publishing Company. Michael (michael@alexander.terranet.com) is a long time Internet user and frequent poster on Usenet.

I asked him what he thought about the quality of information that can be found in these newsgroups. He replied, "gathering information is often a matter of developing good relationships with people whose posts you find are worthwhile. When I started scanning, I posted messages all of the time asking for help and a number of kind individuals responded and helped me considerably. Now, six scanners later, I am still corresponding with some of those same people."

Bill Cheek, author of the famous CHEEK scanner books, has found himself in a peculiar situation on these newsgroups. It seems he gave someone some questionable advice and another scanner expert named Andy Moss picked up on it and accused Cheek of not knowing what he was talking about.

This spawned an entire war between the two, with frequent commentaries being placed by other people. This goes to show that you have to be careful what you write in cyberspace, there are a lot of people in the world using USENET, and they can be easily offended.

REC.RADIO.SWAP

If you are looking to buy or sell scanner equipment, this is the place to visit. Like real swap meets, you can buy and sell anything here, electronics, computers, radios, antennas, scanners, books, magazines and even furniture to house your equipment. Many people have swapped, bought and sold equipment successfully

using this group. As with any other medium, though, there are protocols that make the experience easier if they're followed. These guidelines are basically the same for trading newsgroups on the net, such as misc.forsale.

The best guideline to follow in this newsgroup is to keep it a place to trade. Don't post question and discussion articles to this group. If you have a question about something, use the appropriate discussion group such as alt.radio and rec.radio newsgroups. If you have a specific question about the items that have been advertised, it is best to use email to contact the owner. If you stray from this advice, and post a question to a swap group-you may find your mailbox full of e-mail from angry people.

One of the biggest mistakes people have made on the Internet is using it as a free advertising medium for their business. Last year a law firm "spammed" Usenet (posting the same message on EVERY one of the thousands of newsgroups) and caused quite an uproar. A lot of people do not like the idea of companies using the Internet as a commercial vehicle - and some servers that carry Usenet traffic actually prohibit commercial use. If you have a business that sells radio equipment, it is best not to advertise on rec.radio.swap. The World Wide Web offers a better way of advertising your product.

The best way to post a message offering something for sale, or wanted, is to identify everything in the subject line. Start with the word "FOR SALE" or "WANTED" (some people abbreviate) and follow it up what you are interested in. For example, "FOR SALE: Uniden200XLT Cellular restored," is short and lets the person browsing the ads know what you are offering without having to read the message. Most systems cut the subject length off at 80 characters, and some at 40, so you will have to be brief.

Rec.radio.swap is a virtual swap meet, and you are using the Internet-but people still like to know you are a real person. Include your city and state, along with a telephone number where you can be reached. Besides assuring your potential buyer or seller that you are an actual person, it's often easier to bargain and make other arrangements on the telephone than through an extended e-mail exchange. Some buyers prefer dealing with folks in their local area, too, as that makes it easier for them to inspect the equipment before paying money.

Selling

It is important to be specific in your first post about what you are selling and how much you want for it. You can add that the price is negotiable, but people will probably bargain with you anyway. Explain whether or not the price includes shipping, and if it does, be sure you know how much it will cost to ship it. Avoid sending out "for sale" posts unless you are willing to arrange for shipping to whomever wants to buy it. Usenet messages are broadcast all over the world, so understand that you might get an offer from Tokyo. Make sure you can ship the equipment soon, or you may upset someone.

After the deal has been made, type the terms you have agreed on and e-mail them to the buyer. This way there is no confusion about how and when the item will ship-along with terms of payment. It is a good idea to buy insurance for your equipment, along with packaging it securely. You will have to check with the shipping company you are going to use to see how they can handle payment options such as COD (collect on delivery).

Sample Pages From The Internet:

alt.radio.scanner

Page 1 of 15 [553 messages in 284 discussion threads]

1. Scanner Holder
2. Cordless phone frequencies
3 Radio Shack Pro-2005 400CH For Sale
4. pro-23
5. F.D.N.Y. Handie Talkie F-7??
6. PRO-30
7. Need antenna for apartment dweller (2 msgs)
8. Copier utility (3 msgs)
9. (no subject)
10. Pro 62, What's the story? (2 msgs)
11. Bearcat Model 260 Information Needed
12. Pro 26 Scanner for sale! (2 msgs)
13. using scanner on airplane (5 msgs)
14. FS: Motorola Saber III c/w charger, mic, & extra battery (6 msgs)
15. Share Freqs UHF Military (4 msgs)
16. Rose Parade (2 msgs)
17. AR-3000 Documentation & Software
18. Bearcat 205 XLT search question
19. Need Canadian law info on scanners and radar detectors (2 msgs)

Enter Thread Number, MORE, ADD, ?, or EXIT:

rec.radio.scanner

Page 22 of 24 [1023 messages in 452 discussion threads]

400 pro-51 mods for #3A5
401 Legal Question about scanning ... ???? (2 msgs)
402 Cruise Line Freq's (2 msgs)
403 software for opto456 and pro2006
404 PRO-2006 S-Meter mod, Audio or Carrier? (2 msgs)
405 Looking for info on extended freq. formula (3 msgs)
406 FS: Uniden 800XLT Bearcat (2 msgs)
407 What's above 1300 MHz? (2 msgs)
408 Hi folks...I need some advice...
409 scanner antennas
410 A first attempt, tell me what you think!!!! (3 msgs)
411 looking for mod for cordless phone
412 Casino freq's in Nova Scotia
413 Cell Program ?
414 FS: Radioscanner for PC
415 Philadelphia fire NEW freqs. (2 msgs)
416 Homemade scan antenna attic
417 Help with GE Trunking System & Scanning
418 All Ohio Scanner Club

rec.radio.swap

Page 13 of 55 [1293 messages in 1032 discussion threads]

229 ***WTB: PRO 43 SCANNER***
230 FS Optoelectronics Scout REACTION TUNE
231 FS PRO-2006 Scanner
232 FS=tempo 2020 ext. vfo (2 msgs)
233 FS: Ten-Tec Hercules Amp
234 Collins KWM-380
235 WTB: Cabinet for Collins 75-A2/A3
236 FS: Kenwood TS-820S/R-820 TWINS
237 Need Interconnection cable for HP8505 Network Analyzer or will trade.
238 TRADE: 386 Computer system for AOR Scanner
239 WANTED: Bearcat scanner with all mods
240 WANTED: Desk Mic for ICOM 730 hf rig
241 FS: HP-8660A Signal Generator (2 msgs)
242 WTB: Heath SB-634, SB-614, and SB-604
243 FS-VINTAGE TUBE TYPE CB

Buying

When buying equipment on rec.radio.swap-don't be afraid to bargain. Equipment tends to move pretty fast, most people get and give a fair price. If you make a deal with someone, be prepared to either pay up front or upon delivery. Remember that there are costs incurred with packaging, shipping and insurance.

If you come across a deal that sounds too good to be true, you might want to ask someone more experienced what they think of the deal-there are some crooks out there. This is a real problem on some of the online services-where people will contact you about $5000 laptops for $500. They will even accept a down payment, but it has to be in cash and sent before the equipment ships. Most of the time these guys are on a temporary account and are using a P.O. box-both of which will be canceled soon after the money arrives. Things like real addresses, real telephone numbers, and the ability to take a personal check are indications of a honest deal.

Jay Maynard (e-mail: jmaynard@admin5.hsc.uth.tmc.edu) is the author of the rec.radio.swap FAQ. This is a public domain text file that discusses the most [F]requently [A]sked [Q]uestions about swapping radio and electronic equipment via Usenet. It is posted regularly on rec.radio.swap. Jay says that he has sold equipment within three hours of posting the initial message, but he also warns people to be careful when purchasing unseen equipment.

Another good resource to read is the frequent postings of Bob Parnass. He has online guides on topics like, "Introduction to Scanning" and "How to purchase a used scanner". Look for his postings on rec.radio.scanner.

Illegal Equipment

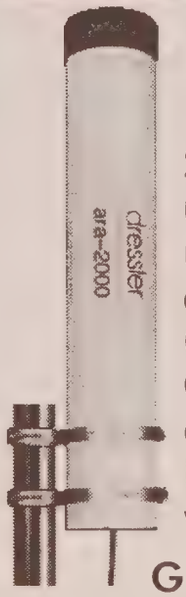
The Associated Press recently reported that a guy in New York City was arrested for using a World Wide Web page to advertise and sell illegal equipment. The Secret Service and the Drug Enforcement Administration arrested him after receiving court approval to monitor "conversations" on the Internet, said a spokesman from the Secret Service. The investigation began after AT&T notified federal authorities that someone was selling illegal devices on the Internet. The company was concerned that illegal activity was occurring over its telephone lines.

He was dealing mainly in cloned cellular phones, but also had stolen equipment for sale. When they raided his home, they found thousands of dollars worth of cellular cloning devices and illegal bugging equipment as well as lap-top computers, scanners, bugging transmitters and receivers and a satellite cellular telephone.

The Internet has a lot of people online. Most of them are honest and straightforward, but others are not. You have to be careful about some of the illegal situations that are out there. If you have some illegal equipment for sale, you should not try to advertise it on the Internet.

USSN

NEW VHF/UHF ACTIVE ANTENNA!



dressler ara–2000

Successor to the popular ara–1500 model, the new ara–2000 utilizes a GaAs–FET amplifier for maximum gain (11–13 dB up to 1.5 GHz) and minimum noise figure (1–2.5 dB), while delivering excellent third–order intercept point performance (+40 dBm below 500 MHz, +43 dBm above 500 MHz). Coverage from 50—2000 MHz, circular polarization, N–type coax connectors. A fantastic antenna for the Icom IC–R7000/R7100, AOR and Realistic Scanners, and other wideband receivers. Call for free catalog.

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The Scanner Man

Remote Scanning

Listen to your scanner from around the house without taking it with you.

by The USSN Staff

Subscriber and fellow scanner listener, Ken Reherman, in Indiana sent us a letter detailing his solution to monitoring around the house or yard while not having to carry around his expensive handheld radio.

Ken got himself one of those baby monitors, the self-contained 49 MHz transmitter units that pick up the audio in a room and transmit it to a hand-carrier receiver. This allows a parent to monitor for audio activity (that would be crying noises!) or, I suppose, lack of activity, both possibly indicating a need for attention by the parent. They are a neat idea, although few parents probably realize that they are in effect "bugging" their houses, since they seldom turn them off when not in use and they transmit any sound within range to anyone with a 49 MHz scanner, walkie-talkie or cordless telephone on the same channel.

Ken resorted to this method for a number of reasons. Besides the risks of carrying around an expensive portable, your handheld may not have 225 to 400 or 800 MHz coverage or you may get tired of buying (or recharging) batteries for your power-hungry handheld. He picked his baby monitor up at a flea market.

Just set the transmitter unit in front of your scanner where it will pick up the audio from the speaker. Turn it on and listen on the portable receiver unit. You could, of course, also pick it up on a scanner, but that defeats the purpose. This might not be a bad idea, though, if you have an old, beat-up handheld that you don't care about and want to be able to monitor your base unit that has 800 MHz or other bands, using your base radio's outside antenna.

This idea isn't new, of course. Others have suggested it in the past. The Scannerman even came up with a slick system years ago. One of the surplus outfits (Fair Radio in Ohio, I think) once sold surplus walkie-talkies for about four bucks each. Since you could get three for ten bucks, and always having an eye for a bargain, I opted for that. They were just the circuit board, no case, no speaker, no anything. I removed the push-to-talk switch and permanently soldered the unit into the transmit mode. I then mounted it in a case, with a Motorola jack on the back for a short whip antenna and jacks for an AC power adaptor and audio input. Then I found a buddy who had a pair of el-cheapo walkie-talkies and traded him one of the chassis for one of the walkie-walkies. So we both had systems! The cheap Radio Shack walkie-talkies didn't even have a squelch but the "base" unit tranmitted continuously and as long as you are within its range, the carrier provided full quieting. It really worked slick. I still use it occasionally.

No matter what approach you use, *DON'T* play around with extending the antenna height to increase the range. Besides being a violation of FCC Part 15, it'll cause all kinds of problems, not the least of which is the fact that in an urban area it is almost *GUARANTEED* that someone will hear your signal and wonder what the heck is going on! Most baby monitors operate on the widest-spaced three of the five 49 MHz low power Part 15 frequencies; 49.83, 49.86 and 49.89 MHz. 49.86 is the most common one used by your toy walkie-talkies and all five 49 MHz channels are also input frequencies for 46 MHz cordless telephones. Someone starts hearing a police stake-out or F-16's chattering back and forth on their telephone, or their own baby monitor, is going to be very concerned. You only want coverage in your immediate vicinity, so don't play around with increasing the range to cover the whole neighborhood!

Ken does mention another neat advantage, though. He has a buddy living nearby who also happens to be a scanner enthusiast. He doesn't have an 800 MHz-capable scanner, however. So he can listen to Ken's by putting in his baby monitor frequency! Neat idea!

I'm not too sure about his final suggestion, though. As he says, when he's over at his buddies house, monitoring the 800 MHz scanner in his home, his wife can go in the radio room and simply speak into the transmitter unit to advise him when dinner is ready. Or, no doubt, to remind him about that clogged drain or the dirty gutters. Hey, I don't need that. You shouldn't have told her about it, Ken!

USSN

Press Releases

Late Breaking News

ARTSCI Radio Tech Modifications 8A & 8B, PROBE version 2.0,.

by The USSN Staff

Radio Tech Modifications 8A & 8B

Artsci enters its 15th year and is proud to present the new editions of its popular Radio Tech Modification books. The Radio Tech Modification books are indispensable tools for radio repair technicians and amateur radio hobbyists who are serious about enhancing radio transceivers and scanners.

November of 1995 brings editions 8A and 8B to the radio marketplace. These new editions cover the new radios announced in 1995 and all radios presented in the previous editions. The new page format is simplified and the illustrations are detailed and easy to follow.

In case you are not familiar with the two edition set, the "A" edition contains modification information for Kenwood and Icom Amateur radios as well as Uniden, Regency and Radio Shack scanners. The "B" edition completes the set with all the modications for Alinco, Yaesu, Standard, Azden, RCI and other amateur radios and modifications for Citizen Band (CB) radios.

The typical modifications presented in these new editions increase the radio's frequency transmit-and-reception coverage. Many of the modifications will allow a radio or scanner to monitor "illegal" frequencies.

The Radio Tech Modification books are available nationwide. Visit your local radio store or neighborhood book store. Artsci will ship worldwide.

Each volume retails for $19.95. Shipping from California is $4.00 in the USA.

Artsci product information is available on the INTERNET:
Release Date: February 15th, 1996

Probe Version 2.0 Software

DataFile Inc. announces a brand new software release of Probe Version 2.0, developed exclusively for Optoelectronic's OptoScan 456 and 535 computer-to-scanner interfaces made to work with Radio Shack's Pro-2005, 2006, 2035 and 2042 scanners. Over 70 new features and enhancements have been added to Probe.

With the release of this new version of Probe comes a new-and-exciting advancement to "Computer Controlled Scanning" called "SmartScan" (TM). SmartScan allows the scanning enthusiast to follow fast breaking action. Key frequencies are assigned as triggers causing the software to focus on a specific bank of a few frequencies, or as many as 1000, or to add an extra bank to those already being scanned. When a transmission is detected on one of these key frequencies, the SmartBank is automatically activated to focus in on the action in that bank for a specified amount of dwell time. For each key frequency, you can choose whether the SmartBank will be scanned exclusively, or will be added to the existing banks already being scanned. The length of time spent in each mode can be tailored to your own situation.

As an example, if you designate the air emergency frequency 121.5000 as a key frequency and it becomes active, you can have your scanner exclusively scan only those frequencies related to the air emergency frequency, like the local tower, ground control, rescue squad and air port security-or you can include them with the other frequencies being

I GUESS MAYBE YOU SHOULD HAVE CHECKED THE LOCAL SCANNER LAWS.

scanned in the non-exclusive mode. Once the action settles down, normal scanning is automatically resumed.

Many "computer control scanning enthusiats" have discovered a dedicated computer is a must for their hobby. Probe software works on virtually any DOS based computer for this reason. Probe Version 2.0 features increased scanning speed over previous versions of up to 37% on older computers. For example, AT/12MHz computers, which are increasingly cheaper and easier to find in the second hand market, can be used with Probe and can attain scanning speeds of 50+ frequencies per second without additional requirements of extra memory, graphics card or Windows.

Some of the new features and enhancements include improved tools for frequency management and superior CTCSS/DCS tone control. Utilities for importing PerCon FCC data files and creating search files have been enhanced. Manual tuning now provides tone and signal strength readout. Export of frequency and log files to three different formats of ASCII text files has been added. Probe also includes revised and expanded documentation.

These new features and enhancements continue to live up to Probe's great reputation for being easy to use, efficient and the fastest OptoScan software available. Additional features include immediate scanning with a single keystroke without having to wait on loading frequencies. 19200 baud is now supported for maximum performance with the OptoScan 535.

Probe has a true database engine using the dBASE format providing large capacity frequency management of up to 4000 groups of 99 banks, each bank containing up to 1000 frequencies. Banks are quickly and easily activated or deactivated directly from the scanning screen. Probe's frquency data structure was modeled directly from the FCC databases, therefor it is able to make the best use of them and is able to provide the most onscreen frequency data in an easy-to-read format.

Probe Version 2.0 is avaiable from DataFile, Inc. for $129.95 plus $7.95 S&H. Check, money order, MC & Visa accepted. Orders can be sent to DataFile, Inc., POB 20111, St. Louis, MO 63123. Write to DataFile, Inc. for a list of additional features and reprints of reviews. Datafile may also be contacted through the Internet at DATAFILE@GENIE.COM.

Press Release

DX Radio Supply announces a fantastic new book titled: "Monitoring Cellular Phones Is A Violation Of Federal Law", by well known scanner columnist, Steve Donnell. The book highlights a wide range of issues about Cellular phones, from the perspective of the hobby radio listener.

The book profiles some of the typical users of Cell phones, and explains some of the security problems facing Cell phone usage it also provides a detailed look at how Cellular systems operate: Covering how calls are received, placed, and transferred from one cell to another. A detailed channel list is included of all the 800 MHz radio frequencies used by Cellular phones and how these frequencies are assigned to different Cellular systems and individual Cell-site towers.

Steve then details some of the different techniques that can be used with various scanners, that can be used in listening Cell phone systems, and how you can optimize your monitoring activities to hear some of the *HOTTEST* action on the Cellular bands.

There is extensive coverage on choosing the best scanners for Cell phone monitoring, details of how Cellular phone band frequency programming can be restored in older scanner models, and how a technique, developed by Steve, known as the Virtual Downconverter, can be implemented in many of today's scanners. (Which supposedly can not be restored to receive Cell phones).

Other areas of the book highlight selecting various accessories such as antennas, preamps, and signal filters that can be used to further optimize Cellular reception. There is also a look at some types of test equipment, Ham radios, and even how some models of Cellular phones themselves, can be used as *VERY* effective receivers for Cellular phone band reception.

In the back, there is a special section of interest to electronics experimenters, with details on constructing several different simple accessory circuits for use with your scanner, including a special type of tone decoder to help ID Cellular voice signals.

Monitoring Cellular Phones Is A Violation Of Federal Law, is available for $9.95 (postage paid), from:

DX Radio Supply
PO Box 360
Wagontown, PA 19376
or call: 610-273-7823

Near Term Digital Radio

A news item in a recent issue (6/19/95) of Government Computing News announced that the Army has requested proposals for a new digital radio system to serve as a portable switching center for a number of command and control applications now being developed under the Army's Force XXI initiative. The initial contract is for only 550 units of what it calls the Near-Term Digital Radio (NTDR), but later phases of the contract will evolve into the Future Digital Radio multichannel, multi-mode transceiver that will replace the current Single-Channel Ground Radio System (SINCGARS) within ten years.

ITT Aerospace and General Dynamics Land Systems are the current contractors for SINCGARS and will probably be joined by Hughes Data Systems and GEC-Marconi in competition for the NTDR contract.

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Airline Phones

AT&T Wireless Services (formerly Claircom/McCaw) is now offering incoming calls to airline passengers using the 849 to 851 MHz Air-to-Ground RadioTelephone Service. Previously, passengers have only been able to place outgoing calls.

Available on most Northwest, Alaska and Southwest flights, you must pre-enroll for the service, giving the usual credit card or other billing info, in addition to the numbers from which you wish to receive calls. From that point on, you may register your flight and seat number when you board a plane, letting the system know where you are. A calling party then only has to dial a toll-free 800 number (1-800-RINGSKY - pretty catchy, huh), and then enter your number and their number. The cost to you is $2.50 a minute.

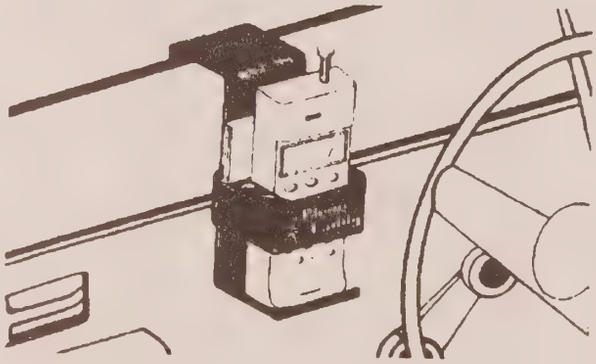
GTE AirFone has been offering a similar service for over a year.A traveler is issued a card and a ten-digit I.D. number. He uses the card to register on the phone at his seat when he boards the plane. A calling party dials GTE's toll-free number, then enters the ten-digit number and their own number. The calling party's number is displayed on the phone at the flyer's seat, allowing him to decide if he wishes to answer the call, since the charges are the same as for an outbound call. GTE provides service on United, Delta, US Air Shuttle and TWA airlines.

USSN

HE HAS A HEARING PROBLEM . . . HE CAN HEAR THE POLICE AND THE FIRE DEPARTMENT BUT NOT WHEN I TELL HIM TO TAKE OUT THE TRASH.

PHONE CADDY

The Phone Caddy will hold almost any handheld scanner or radio. Comes with a note pad and indexed booklet to write frequencies or names in. Compartment behind radio holds note pad and two pencils. 2 13/16″ across by 1 11/16″ deep. $9.95 + $3.00 S&H. Send check or money order or call 800-890-6999 with VISA. MC, or Discover.



U.S. Scanner Publications
PO Box 14923
Portland, OR 97293
800-890-6999

Frequency Forum

Public Safety License Applications

Because of the government shutdown there are considerably fewer listings this month.

GF	Conventional PS-National Plan	PL	Local Government
GP	Conventional PS & Spc Emerg	PM	Emergency Medical
IB	Business	PO	Forestry Conservation
IS	Special Industrial	PP	Police
IW	Power	PS	Special Emergency
LI	Interurban Passenger	YA	Trunked PS
PF	Fire	YF	Trunked PS-National Plan
PH	Highway Maint.	YP	Trunked PS & Special Emerg.

by O.E. Simonson

Alabama

MOBILE	ALABAMA, STATE OF	PND00754	154.0250	PL
MOBILE	ALABAMA, STATE OF	PND00754	159.0000	PL
ORANGE BEA	ORANGE BEACH, CITY OF	PND01071	155.0400	PL

Arkansas

BEEBE	BEEBE, CITY OF	PND00754	460.3750	PP
BEEBE	BEEBE, CITY OF	PND00754	465.0750	PP
BEEBE	BEEBE, CITY OF	PND00754	465.3750	PP

Arizona

	PHOENIX, CITY OF	PNR10258	453.3375	PL
	PHOENIX, CITY OF	PNR10258	453.3625	PL
	PHOENIX, CITY OF	PNR10258	453.7625	PL
	PHOENIX, CITY OF	PNR10258	453.9625	PL
	PHOENIX, CITY OF	PNR10258	458.3375	PL
	PHOENIX, CITY OF	PNR10258	458.3625	PL
	PHOENIX, CITY OF	PNR10258	458.7625	PL
	PHOENIX, CITY OF	PNR10258	458.9625	PL
DOUGLAS	DOUGLAS, CITY OF	PND01071	154.7400	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	154.9650	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	155.0100	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	155.4750	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	155.5500	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	155.6250	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	158.9100	PP
DOUGLAS	DOUGLAS, CITY OF	PND01071	159.2100	PP
YUCCA	YUCCA VOLUNTEER FIRE DISTRICT	PND00938	154.1900	PF
YUMA	YUMA, CITY OF	PN502853	856.0250	YP
YUMA	YUMA, CITY OF	PN502853	856.2250	YP
YUMA	YUMA, CITY OF	PN502853	857.2250	YP
YUMA	YUMA, CITY OF	PN502853	858.2250	YP
YUMA	YUMA, CITY OF	PN502853	859.2250	YP
YUMA	YUMA, CITY OF	PN502853	860.2250	YP
YUMA	YUMA, CITY OF	PN502853	861.0000	YP
YUMA	YUMA, CITY OF	PN502853	862.0000	YP
YUMA	YUMA, CITY OF	PN502853	864.0000	YP
YUMA	YUMA, CITY OF	PN502853	865.0000	YP

California

	NEWARK, CITY OF	PNR97661	491.6125	PF
	SANTA CLARA COUNTY CENTRAL FIRE	PNR10491	465.6125	PF
	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	45.9600	PS
	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	46.0400	PS
	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	47.4600	PS
ANAHEIM	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	45.9600	PS
BURNEY	REDDING AREA BUS AUTHORITY	PND00610	860.2375	GP
CHATSWORTH	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
CORONA	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	45.9600	PS
CORONA	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	46.0400	PS
CORONA	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	47.4600	PS
EL MODENA	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	45.9600	PS
FREMONT	LASSEN, COUNTY OF	PNR10414	851.3625	BA
LAGUNA BEA	SOUTHLAND LIFEFLEET AMBULANCE SE	PNR10307	47.4600	PS
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	37.9200	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	37.9400	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	37.9600	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	150.9950	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	158.9850	PH
LOS ANGELE	LOS ANGELES, COUNTY OF	PNR10312	159.0600	PH
MALIBU	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
NEWARK	NEWARK, CITY OF	PNR97662	488.6125	PF
PALMDALE	LOS ANGELES, COUNTY OF	PNR10312	150.9950	PH
PALMDALE	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
PALOS VERD	LOS ANGELES, COUNTY OF	PNR10312	150.9950	PH
PALOS VERD	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
PASADENA	LOS ANGELES, COUNTY OF	PNR10312	37.9400	PH
PASADENA	LOS ANGELES, COUNTY OF	PNR10312	150.9950	PH
PASADENA	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
REDDING	REDDING AREA BUS AUTHORITY	PND00610	860.2375	GP
REDWOOD CI	REDWOOD CITY, CITY OF	PND00834	866.3500	GF
SACRAMENTO	CALIFORNIA, STATE OF	PND00754	453.5500	PL
SACRAMENTO	CALIFORNIA, STATE OF	PND00754	458.5500	PL
SAN DIMAS	LOS ANGELES, COUNTY OF	PNR10312	151.0400	PH
SANTA ANA	CALIFORNIA, STATE OF	PNR10300	154.6800	PP
SANTA BARB	SANTA BARBARA, CITY OF	PNR10313	158.9250	PL
SOUTH SAN	SOUTH SAN FRANCISCO, CITY OF	PND00785	490.5875	PP
SOUTH SAN	SOUTH SAN FRANCISCO, CITY OF	PND00785	493.5875	PP
VALLEJO	CALIFORNIA, STATE OF	PND00754	453.8250	PL
VALLEJO	CALIFORNIA, STATE OF	PND00754	458.8250	PL
VALLEJO	CALIFORNIA, STATE OF	PND00754	458.8750	PL

Connecticut

	BERLIN HOUSING AUTHORITY	PND01072	453.2875	PL
	BERLIN HOUSING AUTHORITY	PND01072	458.2875	PL
	CONNECTICUT, STATE OF	PND01071	453.5375	PL
BRANFORD	BRANFORD, TOWN OF	PND01057	453.4500	PM
BRANFORD	BRANFORD, TOWN OF	PND01057	458.4500	PM
BRANFORD	CONNECTICUT, STATE OF	PND01071	460.1250	PP
BRANFORD	CONNECTICUT, STATE OF	PND01071	465.1250	PP
GROTON	GROTON, CITY OF	PNR10316	154.0850	PL
GROTON	GROTON, CITY OF	PNR10316	155.0250	PL

Delaware

DOVER	DELAWARE, STATE OF	PND01052	866.0125	YF
DOVER	DELAWARE, STATE OF	PND01052	866.0750	YF
DOVER	DELAWARE, STATE OF	PND01052	866.5125	YF
DOVER	DELAWARE, STATE OF	PND01052	866.6500	YF
DOVER	DELAWARE, STATE OF	PND01052	866.6750	YF
DOVER	DELAWARE, STATE OF	PND01052	867.0125	YF
DOVER	DELAWARE, STATE OF	PND01052	867.1250	YF
DOVER	DELAWARE, STATE OF	PND01052	867.5125	YF
DOVER	DELAWARE, STATE OF	PND01052	867.6500	YF
DOVER	DELAWARE, STATE OF	PND01052	867.6750	YF
DOVER	DELAWARE, STATE OF	PND01052	867.9500	YF
DOVER	DELAWARE, STATE OF	PND01052	868.0125	YF
DOVER	DELAWARE, STATE OF	PND01052	868.6500	YF
DOVER	DELAWARE, STATE OF	PND01052	868.7500	YF
DOVER	DELAWARE, STATE OF	PND01052	868.9000	YF
FELTON	DELAWARE, STATE OF	PND01052	866.0125	YF
FELTON	DELAWARE, STATE OF	PND01052	866.0750	YF
FELTON	DELAWARE, STATE OF	PND01052	866.5125	YF
FELTON	DELAWARE, STATE OF	PND01052	866.6500	YF
FELTON	DELAWARE, STATE OF	PND01052	866.6750	YF
FELTON	DELAWARE, STATE OF	PND01052	867.0125	YF
FELTON	DELAWARE, STATE OF	PND01052	867.1250	YF
FELTON	DELAWARE, STATE OF	PND01052	867.5125	YF
FELTON	DELAWARE, STATE OF	PND01052	867.6500	YF
FELTON	DELAWARE, STATE OF	PND01052	867.6750	YF
FELTON	DELAWARE, STATE OF	PND01052	867.9500	YF
FELTON	DELAWARE, STATE OF	PND01052	868.0125	YF
FELTON	DELAWARE, STATE OF	PND01052	868.6500	YF
FELTON	DELAWARE, STATE OF	PND01052	868.7500	YF
FELTON	DELAWARE, STATE OF	PND01052	868.9000	YF

Florida

	FLORIDA STATE FAIR AUTHORITY	PND01071	460.3875	PL
	NORTH RIVER FIRE DISTRICT	PNR10212	153.8600	PF
	NORTH RIVER FIRE DISTRICT	PNR10212	153.9500	PF
	NORTH RIVER FIRE DISTRICT	PNR10212	154.1900	PF
	NORTH RIVER FIRE DISTRICT	PNR10212	154.3700	PF
	PALM BEACH, COUNTY OF	PND00711	451.8625	IS
	PALM BEACH, COUNTY OF	PND00711	456.8625	IS
BRADENTON	NORTH RIVER FIRE DISTRICT	PNR10212	154.1900	PF
CRESTVIEW	DORCAS FIRE DISTRICT	PND00760	154.2350	PF
DANIA	DANIA, CITY OF	PNR10310	154.1300	PF
DELRAY BEA	DELRAY BEACH, CITY OF	PND00616	155.8800	PL
EASTPOINT	ST GEORGE ISLAND VOL FIRE DEPT I	PND00939	153.8300	PF
EASTPOINT	ST GEORGE ISLAND VOL FIRE DEPT I	PND00939	154.3250	PF
EASTPOINT	ST GEORGE ISLAND VOL FIRE DEPT I	PND00939	154.3700	PF
ELLENTON	NORTH RIVER FIRE DISTRICT	PNR10212	153.8600	PF

ELLENTON	NORTH RIVER FIRE DISTRICT	PNR10212	153.9500	PF
ELLENTON	NORTH RIVER FIRE DISTRICT	PNR10212	154.1900	PF
ELLENTON	NORTH RIVER FIRE DISTRICT	PNR10212	154.3700	PF
HIGH SPRIN	HIGH SPRINGS, CITY OF	PNR10420	154.2950	PF
JACKSONVIL	MAYO FOUNDATION	PND00761	152.0075	PS
MIAMI	FLORIDA, STATE OF	PNR10313	45.1600	PL
ORANGE PAR	MAYO FOUNDATION	PND00761	152.0075	PS
PALMETTO	NORTH RIVER FIRE DISTRICT	PNR10212	153.8600	PF
PALMETTO	NORTH RIVER FIRE DISTRICT	PNR10212	153.9500	PF
PALMETTO	NORTH RIVER FIRE DISTRICT	PNR10212	154.1900	PF
PALMETTO	NORTH RIVER FIRE DISTRICT	PNR10212	154.3700	PF
SAINT GEOR	ST GEORGE ISLAND VOL FIRE DEPT I	PND00939	154.3700	PF
TALLAHASSE	FLORIDA, STATE OF	PND00887	453.2250	PL
TALLAHASSE	FLORIDA, STATE OF	PND00887	458.2250	PL

Illinois

BIGGSVILLE	BIGGSVILLE FIRE PROTECTION DISTR	PND01058	154.2650	PF
BIGGSVILLE	BIGGSVILLE FIRE PROTECTION DISTR	PND01058	154.3250	PF
WATERLOO	BIGGSVILLE FIRE PROTECTION DISTR	PND01058	154.1900	PF
WATERLOO	BIGGSVILLE FIRE PROTECTION DISTR	PND01058	154.2950	PF
WOODLAWN	BIGGSVILLE FIRE PROTECTION DISTR	PND01058	154.4300	PF

Indiana

SAINT JOE	CONCORD, TOWNSHIP OF	PND01058	154.2800	PF
SAINT JOE	CONCORD, TOWNSHIP OF	PND01058	154.3550	PF

Kansas

ROSALIA	FIRE DISTRICT 5	PND01058	453.0750	PF
ROSALIA	FIRE DISTRICT 5	PND01058	458.0750	PF

Louisiana

CRAVENS	VERNON PARISH FIRE DISTRICT NUMB	PND01037	154.2650	PF
LEESVILLE	VERNON PARISH FIRE DISTRICT NUMB	PND01037	153.8300	PF
LEESVILLE	VERNON PARISH FIRE DISTRICT NUMB	PND01037	154.2650	PF

Massachusetts

	ACTON, TOWN OF	PNR10312	39.3800	PP
	ACTON, TOWN OF	PNR10312	155.0100	PP
	ACTON, TOWN OF	PNR10312	155.2500	PP
	FAIRHAVEN, TOWN OF	PNR10345	485.8125	PP
	FALL RIVER, CITY OF	PNR10385	485.3625	PP
	FALL RIVER, CITY OF	PNR10385	485.3875	PP
	FALL RIVER, CITY OF	PNR10385	485.6875	PP
	RAYNHAM, TOWN OF	PNR10395	485.5125	PP
	RAYNHAM, TOWN OF	PNR10395	486.0625	PP
	STOUGHTON, CITY OF	PNR10396	460.6125	PF
	STOUGHTON, CITY OF	PNR10396	460.6375	PF
ACTON	ACTON, TOWN OF	PNR10312	39.3800	PP
ACTON	ACTON, TOWN OF	PNR10312	155.0100	PP
ACTON	ACTON, TOWN OF	PNR10312	155.2500	PP
BOXBOROUGH	ACTON, TOWN OF	PNR10312	154.8150	PP
CHICOPEE	CHICOPEE, CITY OF	PND00254	451.0500	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	451.1500	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	451.2500	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	451.6250	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.0000	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.0375	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.0625	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.1500	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.2500	IW
CHICOPEE	CHICOPEE, CITY OF	PND00254	456.6250	IW
DRACUT	DRACUT, TOWN OF	PNR10252	482.8875	PP
DRACUT	DRACUT, TOWN OF	PNR10252	485.8875	PP
FAIRHAVEN	FAIRHAVEN, TOWN OF	PNR10345	485.8125	PP
FALL RIVER	FALL RIVER, CITY OF	PNR10385	482.3625	PP
FALL RIVER	FALL RIVER, CITY OF	PNR10385	482.6875	PP
FALL RIVER	FALL RIVER, CITY OF	PNR10385	485.3625	PP
FALL RIVER	FALL RIVER, CITY OF	PNR10385	485.6875	PP
FRAMINGHAM	FIRE DISTRICT FOURTEEN	PNR10422	33.9800	PF
FRAMINGHAM	FIRE DISTRICT FOURTEEN	PNR10422	46.3600	PF
HANSON	PLYMOUTH, COUNTY OF	PNR10490	485.8875	PP
HANSON	PLYMOUTH, COUNTY OF	PNR10490	486.0375	PP
MEDDLEBORO	PLYMOUTH, COUNTY OF	PNR10490	485.8875	PP
MEDDLEBORO	PLYMOUTH, COUNTY OF	PNR10490	486.0375	PP
MILFORD	MASSACHUSETTS, COMMONWEALTH OF	PNR10311	155.7450	PL
NEW BEDFOR	FAIRHAVEN, TOWN OF	PNR10345	482.8125	PP
PLYMOUTH	PLYMOUTH, COUNTY OF	PNR10490	485.8875	PP
PLYMOUTH	PLYMOUTH, COUNTY OF	PNR10490	486.0375	PP
RAYNHAM	RAYNHAM, TOWN OF	PNR10395	483.0625	PP
RAYNHAM	RAYNHAM, TOWN OF	PNR10395	485.5125	PP
RAYNHAM	RAYNHAM, TOWN OF	PNR10395	486.0625	PP
SHELBURNE	SHELBURNE FIRE DISTRICT	PND00937	33.4800	PF
SHELBURNE	SHELBURNE FIRE DISTRICT	PND00937	33.5400	PF
SHELBURNE	SHELBURNE FIRE DISTRICT	PND00937	453.1625	PF
SHELBURNE	SHELBURNE FIRE DISTRICT	PND00937	458.1625	PF
SHERBURNE	SHELBURNE FIRE DISTRICT	PND00937	33.4800	PF
SHERBURNE	SHELBURNE FIRE DISTRICT	PND00937	33.5400	PF

Maryland

	MARYLAND, STATE OF	PNR10420	458.1875	PL

Maine

AUGUSTA	WINDSOR, TOWN OF	PND00938	465.6000	PF
FRIENDSHIP	FRIENDSHIP, TOWN OF	PND00936	33.7000	PF
FRIENDSHIP	FRIENDSHIP, TOWN OF	PND00936	151.2950	PF
FRIENDSHIP	FRIENDSHIP, TOWN OF	PND00936	153.8300	PF
FRIENDSHIP	FRIENDSHIP, TOWN OF	PND00936	154.2800	PF
WINDSOR	WINDSOR, TOWN OF	PND00938	154.3100	PF
WINDSOR	WINDSOR, TOWN OF	PND00938	154.3850	PF
WINDSOR	WINDSOR, TOWN OF	PND00938	460.6000	PF
WINDSOR	WINDSOR, TOWN OF	PND00938	465.6000	PF

Michigan

BATTLE CRE	CALHOUN, COUNTY OF	PN215073	154.6500	PP
BATTLE CRE	CALHOUN, COUNTY OF	PN215073	155.4900	PP
BATTLE CRE	CALHOUN, COUNTY OF	PN215073	155.6700	PP
BELLEVUE	CALHOUN, COUNTY OF	PN215073	154.6500	PP
HANCOCK	HANCOCK, CITY OF	PNR10310	153.8150	PL
MARSHALL	CALHOUN, COUNTY OF	PN215073	154.6500	PP
MARSHALL	CALHOUN, COUNTY OF	PN215073	155.4900	PP
MARSHALL	CALHOUN, COUNTY OF	PN215073	155.5350	PP
MARSHALL	CALHOUN, COUNTY OF	PN215073	155.6700	PP
MARSHALL	CALHOUN, COUNTY OF	PN215073	158.9100	PP
REPUBLIC	REPUBLIC, TOWNSHIP OF	PND01068	451.2000	IW
REPUBLIC	REPUBLIC, TOWNSHIP OF	PND01068	456.2000	IW

Minnesota

COLERAINE	COLERAINE, CITY OF	PN214928	72.5400	PL
HUTCHINSON	HUTCHINSON IND SCHOOL DIST 423	PNR10310	155.1600	PS

Missouri

EXCELSIOR	BOLLINGER COUNTY CD FIREFIGHTER	PND01058	151.3850	PF
EXCELSIOR	BOLLINGER COUNTY CD FIREFIGHTER	PND01058	154.2800	PF
GRASSY	BOLLINGER COUNTY CD FIREFIGHTER	PND01058	153.9500	PF
GRASSY	BOLLINGER COUNTY CD FIREFIGHTER	PND01058	154.4300	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	154.2800	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	154.3550	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	154.4300	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	453.1125	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	453.7125	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	453.9125	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	458.1125	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	458.7125	PF
GRAY SUMMI	BOLES FIRE PROTECTION DISTRICT	PND00939	458.9125	PF
MOUNTAIN G	MOUNTAIN GROVE, CITY OF	PND00937	154.1750	PF
MOUNTAIN G	MOUNTAIN GROVE, CITY OF	PND00937	159.2100	PF
PIEDMONT	CLEARWATER FIRE PROTECTION DISTR	PN245515	154.4150	PF
PIEDMONT	CLEARWATER FIRE PROTECTION DISTR	PNR10337	154.4150	PF
PROTEM	PROTEM VOLUNTEER FIRE DEPT	PND00938	154.1900	PF
SEDALIA	SEDALIA, CITY OF	PND01052	153.8450	PL
SEDALIA	SEDALIA, CITY OF	PND01052	154.1000	PL
SEDALIA	SEDALIA, CITY OF	PND01052	155.0400	PL

Mississippi

JACKSON	HINDS, COUNTY OF	PND00938	47.4600	PS

Montana

	MONTANA, STATE OF	PNR10340	39.6200	PP
	MONTANA, STATE OF	PNR10340	39.6800	PP
	MONTANA, STATE OF	PNR10340	39.8200	PP
	MONTANA, STATE OF	PNR10340	39.8800	PP
DEER LODGE	MONTANA, STATE OF	PNR10340	39.6200	PP
DEER LODGE	MONTANA, STATE OF	PNR10340	39.6800	PP
ENNIS	ENNIS, TOWN OF	PND01073	154.4712	IW
PABLO	PABLO, CITY OF	PN216194	153.8600	PL

North Carolina

CHARLOTTE	NORTH CAROLINA, STATE OF	PND01052	859.4375	GF
CONCORD	KANNAPOLIS, CITY OF	PNR10421	154.4300	PF
FLETCHER	FLETCHER, TOWN OF	PND01072	153.7850	PL
FLETCHER	FLETCHER, TOWN OF	PND01072	155.4150	PL
FLETCHER	FLETCHER, TOWN OF	PND01072	158.9850	PL
HOLLY RIDG	HOLLY RIDGE, TOWN OF	PNR10503	153.9350	PL
KANNAPOLIS	KANNAPOLIS, CITY OF	PNR10421	154.4300	PF
MARION	MC DOWELL, COUNTY OF	PNR10310	45.2000	PL
NEBO	MC DOWELL, COUNTY OF	PNR10310	45.2000	PL
REIDSVILLE	ANNIE PENN MEMORIAL HOSPITAL INC	PNR10300	155.2200	PS
REIDSVILLE	ANNIE PENN MEMORIAL HOSPITAL INC	PNR10300	155.3400	PS
REIDSVILLE	ANNIE PENN MEMORIAL HOSPITAL INC	PNR10300	163.2500	PS
SALISBURY	GARDNER, JAMES A	PNR10322	155.2650	PS
UWHARRIE	NORTH CAROLINA, STATE OF	PND01052	866.5875	GF
WADESBORO	NORTH CAROLINA, STATE OF	PND01052	853.5125	GF

North Dakota

DICKINSON	DICKINSON, CITY OF	PND00823	453.5000	PP
DICKINSON	DICKINSON, CITY OF	PND00823	458.5000	PP

Nebraska

PIERCE	PIERCE, CITY OF	PNR10416	173.3962	IW

New Hampshire

	AMHERST, TOWN OF	PNR10386	155.1600	PS

AMHERST	AMHERST, TOWN OF	PNR10386	155.1600	PS
CONCORD	MERRIMACK, COUNTY OF	PND01105	155.1300	PP
HENNIKER	MERRIMACK, COUNTY OF	PND01105	155.1300	PP
HOPKINTON	MERRIMACK, COUNTY OF	PND01105	155.1300	PP
LOUDON	MERRIMACK, COUNTY OF	PND01105	155.1300	PP
LOUDON	MERRIMACK, COUNTY OF	PND01105	155.4750	PP
LOUDON	MERRIMACK, COUNTY OF	PND01105	155.6850	PP
LOUDON	MERRIMACK, COUNTY OF	PND01105	155.7000	PP
WARNER	MERRIMACK, COUNTY OF	PND01105	155.6850	PP

New Jersey

FLEMINGTON	HUNTERDON, COUNTY OF	PN216167	453.9000	PL
FLEMINGTON	HUNTERDON, COUNTY OF	PN216167	463.9000	PL
MILLTOWN	MILLTOWN, BOROUGH OF	PNR10350	156.0000	PL
SOUTH ORAN	NEWARK, CITY OF	PNR97486	470.5125	PF
WEST ORANG	NEWARK, CITY OF	PNR97487	470.5125	PF
WILLIAMSTO	MONROE, TOWNSHIP OF	PND01069	508.4625	PP
WILLIAMSTO	MONROE, TOWNSHIP OF	PND01069	508.4875	PP
WILLIAMSTO	MONROE, TOWNSHIP OF	PND01069	511.4625	PP
WILLIAMSTO	MONROE, TOWNSHIP OF	PND01069	511.4875	PP

Nevada

LAUGHLIN	LAUGHLIN, TOWNSHIP OF	PNR10497	158.9550	PP

New York

HORSEHEADS	TOWN AND COUNTRY FIRE DEPARTMENT	PNR10352	46.1800	PF
HORSEHEADS	TOWN AND COUNTRY FIRE DEPARTMENT	PNR10352	462.4500	PF
LANCASTER	LANCASTER, VILLAGE OF	PN361600	154.4637	IW
RONKONKOMA	ISLIP, TOWN OF	PNR97381	480.2125	PL
SYRACUSE	ONONDAGA, COUNTY OF	PND01072	853.0375	GP
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.0800	PF
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.1800	PF
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.3000	PF
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.3200	PF
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.3600	PF
THIELLS	THIELLS ROSEVILLE FIRE DISTRICT	PND01057	46.4800	PF
YONKERS	SENECA FOODS CORP	PND01074	33.0800	PS

Ohio

	CAMBRIDGE PSYCHIATRIC HOSPITAL	PNR10266	154.1600	PS
ABERDEEN	ABERDEEN HUNTINGTON, TOWNSHIP OF	PND00936	33.9000	PF
ABERDEEN	ABERDEEN HUNTINGTON, TOWNSHIP OF	PND00936	153.8300	PF
ABERDEEN	ABERDEEN HUNTINGTON, TOWNSHIP OF	PND00936	154.0700	PF
ABERDEEN	ABERDEEN HUNTINGTON, TOWNSHIP OF	PND00936	154.3700	PF
AKRON	SUMMIT, COUNTY OF	PND00888	453.8750	PL
AKRON	SUMMIT, COUNTY OF	PND00888	458.8750	PL
CAMBRIDGE	CAMBRIDGE PSYCHIATRIC HOSPITAL	PNR10266	154.1600	PS
CAMBRIDGE	CAMBRIDGE PSYCHIATRIC HOSPITAL	PNR10266	163.2500	PS
FINDLAY	OHIO, STATE OF	PND01118	44.9400	PP
FINDLAY	OHIO, STATE OF	PND01118	45.0200	PP
FINDLAY	OHIO, STATE OF	PND01118	45.1000	PP
FINDLAY	OHIO, STATE OF	PND01118	154.6800	PP
FINDLAY	OHIO, STATE OF	PND01118	154.9350	PP
FINDLAY	OHIO, STATE OF	PND01118	155.3700	PP
FINDLAY	OHIO, STATE OF	PND01118	155.4750	PP
GEORGETOWN	ABERDEEN HUNTINGTON, TOWNSHIP OF	PND00936	154.0700	PF
GRATIS	GRATIS, VILLAGE OF	PNR10416	154.1900	PF
GRATIS	GRATIS, VILLAGE OF	PNR10416	154.2800	PF
LIMA	OHIO, STATE OF	PND01070	47.1200	PH
LIMA	OHIO, STATE OF	PND01070	47.2200	PH
LIMA	OHIO, STATE OF	PND01070	47.3400	PH
NEW CONCOR	CAMBRIDGE PSYCHIATRIC HOSPITAL	PNR10266	154.1600	PS
NEW LEXING	NEW LEXINGTON, CITY OF	PNR10502	453.7500	PL
NEW LEXING	NEW LEXINGTON, CITY OF	PNR10502	458.7500	PL
NORWALK	HURON, COUNTY OF	PN214206	39.4400	PL
NORWALK	HURON, COUNTY OF	PN214206	39.5800	PL
NORWALK	HURON, COUNTY OF	PN214206	39.6600	PL
NORWALK	HURON, COUNTY OF	PN214206	155.9850	PL
OBERLIN	ALLEN MEMORIAL HOSPITAL	PNR10299	152.0075	PS
OBERLIN	ALLEN MEMORIAL HOSPITAL	PNR10299	155.2800	PS
OBERLIN	ALLEN MEMORIAL HOSPITAL	PNR10299	155.3400	PS
PORTSMOUTH	PORTSMOUTH, CITY OF	PND01071	154.4787	PL
SANDUSKY	SANDUSKY, CITY OF	PND01061	461.6500	IB
WINTERSVIL	WINTERSVILLE VOLUNTEER FIRE DEPT	PNR10368	33.9400	PF
WINTERSVIL	WINTERSVILLE VOLUNTEER FIRE DEPT	PNR10368	46.2000	PF
WINTERSVIL	WINTERSVILLE VOLUNTEER FIRE DEPT	PNR10368	46.3800	PF

Oklahoma

AFTON	CLEORA COMMUNITY FIRE DEPT INC	PNR10353	154.1300	PF
AFTON	CLEORA COMMUNITY FIRE DEPT INC	PNR10353	155.7600	PF
ALVA	ALVA PUBLIC SCHOOL	PNR10312	155.2200	PS
WASHINGTON	WASHINGTON VOLUNTEER FIRE DEPT	PNR10273	154.1300	PF

Pennsylvania

	MONTOUR, COUNTY OF	PNR10395	46.4600	PF
	MONTOUR, COUNTY OF	PNR10395	46.5000	PF
	PENNSYLVANIA, COMMONWEALTH OF	PND00041	460.9125	PL
	PENNSYLVANIA, COMMONWEALTH OF	PND00041	465.9125	PL
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.0600	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1400	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1800	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.2600	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.3600	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.4400	PF
	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.5000	PF
	WORTH, TOWNSHIP OF	PN216168	156.0750	PL
CARLISLE	WEST PENNSBORO, TOWNSHIP OF	PND01071	453.2000	PL
CARLISLE	WEST PENNSBORO, TOWNSHIP OF	PND01071	458.2000	PL
FAIRFIELD	CARROLL VALLEY, BOROUGH OF	PNR10413	45.4800	PL
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	33.8200	PF
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	453.1250	PF
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	458.1250	PF
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	458.4000	PF
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	458.5500	PF
FARRELL	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	458.8000	PF
GLEN ROCK	SHREWSBURY, TOWNSHIP OF	PNR10311	39.5800	PL
GROVE CITY	PINE, TOWNSHIP OF	PNR10396	37.2600	PL
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	453.0125	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	458.0125	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	458.0375	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	458.0625	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	462.9750	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	463.0250	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	463.0750	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	463.1250	PM
HARMONSBUR	CRAWFORD, COUNTY OF	PN214939	463.1750	PM
HERNDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1800	PF
HERNDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.2600	PF
HERNDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.3600	PF
HERNDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.4400	PF
HERNDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.5000	PF
HOUTZDALE	WEST PENNSBORO, TOWNSHIP OF	PND01071	453.8000	PL
HOUTZDALE	WEST PENNSBORO, TOWNSHIP OF	PND01071	458.8000	PL
HUNTINGDON	WEST PENNSBORO, TOWNSHIP OF	PND01071	45.1600	PL
HUNTINGDON	WEST PENNSBORO, TOWNSHIP OF	PND01071	154.0850	PL
HUNTINGDON	WEST PENNSBORO, TOWNSHIP OF	PND01071	156.0000	PL
LIBERTY	MONTOUR, COUNTY OF	PNR10395	46.4600	PF
LIBERTY	MONTOUR, COUNTY OF	PNR10395	46.5000	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.0600	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1400	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1800	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.2600	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.3600	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.4400	PF
MONTANDON	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.5000	PF
MOUNT HOLL	MOUNT HOLLY SPRINGS, BOROUGH OF	PND01072	453.7500	PL
PITTSBURGH	HEALTH CENTER COMMUNICORP INC	PNR10320	453.0250	PS
PITTSBURGH	HEALTH CENTER COMMUNICORP INC	PNR10320	453.0750	PS
SHAMOKIN	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.1400	PF
SHAMOKIN	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.3600	PF
SHAMOKIN	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.4400	PF
SHAMOKIN	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.4800	PF
SHAMOKIN	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	46.5000	PF
SPRINGDALE	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	33.4200	PF
SPRINGDALE	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	33.6000	PF
SPRINGDALE	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	33.8600	PF
SPRINGDALE	SPRINGDALE VOLUNTEER FIRE DEPART	PND01057	33.9200	PF

Rhode Island

PROVIDENCE	PROVIDENCE, CITY OF	PNR10282	159.3600	PF

South Carolina

CENTRAL	CENTRAL, TOWN OF	PND01073	153.5000	IW
CENTRAL	CENTRAL, TOWN OF	PND01073	158.1300	IW
COLUMBIA	E M S VENTURES INC	PND00761	150.7900	PM
COLUMBIA	E M S VENTURES INC	PND00761	156.1800	PM
EFFINGHAM	WINDY HILL, CITY OF	PND00937	153.9500	PF
EFFINGHAM	WINDY HILL, CITY OF	PND00937	154.3100	PF
FLORENCE	WINDY HILL, CITY OF	PND00937	153.9500	PF
FLORENCE	WINDY HILL, CITY OF	PND00937	154.3100	PF
MONCKS COR	MONCKS CORNER, CITY OF	PNR10497	154.1000	PL
QUINBY	WINDY HILL, CITY OF	PND00937	153.9500	PF
QUINBY	WINDY HILL, CITY OF	PND00937	154.3100	PF
SIX MILE	SIX MILE, TOWN OF	PNR10498	154.0700	PF
WHITEHALL	LOWCOUNTRY REGIONAL TRANSPORTATI	PNR10398	155.8200	PL

South Dakota

MILBANK	SAINT BERNARDS HOSPITAL	PNR10298	157.4500	PS

Tennessee

	OAKLAND VOLUNTEER FIRE DEPT	PND00761	155.2050	PM
	OAKLAND VOLUNTEER FIRE DEPT	PND00761	155.2950	PM
	OAKLAND VOLUNTEER FIRE DEPT	PND00761	155.3400	PM
BOLIVAR	BOLIVAR, CITY OF	PN365311	153.6800	IW
BOLIVAR	BOLIVAR, CITY OF	PN365311	158.2050	IW
CENTERVILL	HICKMAN, COUNTY OF	PND00938	150.7900	PM
CENTERVILL	HICKMAN, COUNTY OF	PND00938	154.1150	PM
CENTERVILL	HICKMAN, COUNTY OF	PND00938	155.2050	PM
CENTERVILL	HICKMAN, COUNTY OF	PND00938	155.3400	PM
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EVENSVILLE	RHEA, COUNTY OF	PN215884	155.3700	PP
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EVENSVILLE	RHEA, COUNTY OF	PN215884	156.0150	PP
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GORDON	TEXAS, STATE OF	PND00775	47.2400	PH
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GRANBURY	TEXAS, STATE OF	PND00775	47.2400	PH
JACKSBORO	TEXAS, STATE OF	PND00775	47.0600	PH
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LUBBOCK	LUBBOCK, CITY OF	PN508657	866.5125	GF
LUBBOCK	LUBBOCK, CITY OF	PN508657	867.0125	GF
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LUBBOCK	LUBBOCK, CITY OF	PN508657	868.0125	GF
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MCALLEN	MC ALLEN, CITY OF	PND00834	857.0500	YP
MCALLEN	MC ALLEN, CITY OF	PND00834	858.0500	YP
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MCALLEN	MC ALLEN, CITY OF	PND00834	860.0500	YP
MCALLEN	MC ALLEN, CITY OF	PND00834	861.0500	YP
MCALLEN	MC ALLEN, CITY OF	PND00834	862.0500	YP
MCALLEN	MC ALLEN, CITY OF	PND00834	863.0500	YP
MCALLEN	MC ALLEN, CITY OF	PND00834	864.0500	YP
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	SEATTLE, CITY OF	PNR96175	851.3625	YP
	SEATTLE, CITY OF	PNR96175	851.4125	YP
	SEATTLE, CITY OF	PNR96175	851.8875	YP
	SEATTLE, CITY OF	PNR96175	851.9375	YP
	SEATTLE, CITY OF	PNR96175	851.9875	YP
	SEATTLE, CITY OF	PNR96175	852.1625	YP
	SEATTLE, CITY OF	PNR96175	852.6375	YP
	SEATTLE, CITY OF	PNR96175	852.6875	YP
	SEATTLE, CITY OF	PNR96175	852.8625	YP
	SEATTLE, CITY OF	PNR96175	852.9125	YP
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	SEATTLE, CITY OF	PNR96175	853.4375	YP
	SEATTLE, CITY OF	PNR96175	853.4875	YP
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	SEATTLE, CITY OF	PNR96175	854.0875	YP
	SEATTLE, CITY OF	PNR96175	854.1875	YP
	SEATTLE, CITY OF	PNR96175	854.2375	YP
	SEATTLE, CITY OF	PNR96175	854.3625	YP
BELLEVUE	SEATTLE, CITY OF	PNR96175	851.3625	YP
BELLEVUE	SEATTLE, CITY OF	PNR96175	852.6875	YP
BELLEVUE	SEATTLE, CITY OF	PNR96175	852.8625	YP
BELLEVUE	SEATTLE, CITY OF	PNR96175	853.4875	YP
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SEATTLE	SEATTLE, CITY OF	PNR96175	851.3625	YP
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SEATTLE	SEATTLE, CITY OF	PNR96175	852.6875	YP
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Jan/Feb–P/R Realistic PRO 2004

Mar–Cell Phone Freq. Layout-Pro 2004 Mods-Police Band Allocations

Apr–P/R Radio Shack Discone-Amateur Radio Bandplan-P/R Bearcat BC 600XLT-Fire Band Allocations

May–FBI-Blue Angels-P/R Regency TS 800 Model 2

Jun–Military Airlift Command-Electronic Comm. Privacy Act-Allocations: 30.000 MHz to 30.980MHz, 150.010MHz to 150.995 MHz, 406.125 MHz to 406.975 MHz

Jul/Aug–Aircraft At Forest Fires-800 MHz Trunking-Allocations: 31.000 MHz to 31.980 MHz, 151.010 MHz to 151.985 MHz, 407.000 MHz to 407.975 MHz

Sep–P/R Bearcat/Uniden BC205XLT-P/R Bearcat/Uniden BC200XLT-Riding The Rails, RR Frequencies-Allocations: 152.0075 MHz to 154.995 MHz

Oct–MARS Military Affiliate Radio System-P/R GRE Super Converter-BC200/205XLT Cell Mods-McChord AFB-800MHz-Allocations: 155.010 MHz to 157.980 MHz

Nov–P/R Realistic PRO 34-Realistic PRO 34 Cell Mods-Cell Phone Monitoring-GRE Mods

Dec–P/R AR3000-P/R AR880-P/R Antenna Specialties MON 52 Antenna-Allocations: 158.010 MHz to 158.985 MHz

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Jan–P/R Larsen Dual Band Antennas-P/R Cobra SR 925

Feb–G.M.R.S.-Air Refueling-Allocations: 159.000 MHz to 159.990 MHz

Mar–Pro 2004 MODS-Aerial Demonstration Teams-Monitoring The Goodyear Blimps-Allocations: 160.005 MHz to160.9950 MHz

Apr–A Look At The Spectrum-Aerial Demonstration Teams-BC-200XLT Again (See Sep. 88 Reprint)

May–FAA -P/R Realistic PRO 2005-P/R AOR AR900-P/R GW 1 Pre-Amp-BC200/205XLT Cell Mods-Aerial Demonstration Teams

Jun–Aircraft Communications-Aircraft Allocations Table-BC 200XLT Update-Meteor Burst Communicationtions-Aerial Demonstration Teams

Jul–Aeronautical Enroute-P/R Lapel Mike-Forestry Conservation-US Forest Service-AOR vs Uniden-Aerial Demonstration Teams-Allocations: 161.010 MHz to 162.000 MHz

Aug–TV Sound-Aircraft Enroute Frequencies-Aircraft Ground Control-Aerial Demonstration Teams

Sep–Aircraft Telephone-Aircradt Flight Test Frequencies-Telecommunications Act Of 1989-Aerial Demonstration Teams

Oct–Coax And Your Scanner-BC 200XLT Update-Hot Times On The Police Band-The Communications Act Of 1934-AWOS Automated Weather Observation System- Additional Aircraft Information-AMSAT-Power Radio Service

Nov–P/R AOR 950-P/R GRE Super Converter II-Monitoring Repeater Inputs-Allocation Table-RF Connectors-Portable Antennas

Dec–P/R Search and Store Module Model SS 45 For 2004, 2005-BC 200XLT Final Chapter-Cellular Information-DXing Low Band-Portable Antennas-1989 Index

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Feb–Refueling Frequencies-P/R Super Amplifier-Turbo Scan 800 TS 2 Power Fix

Mar–P/R RAC Frequency Log Program-Allocations 162.000 MHz to 173.39625 MHz

Apr–P/R Leisure Electronics DSS 8 Digital Scrambler Silencer-Mobile Data Terminals-P/R Regency INF 7 Scanner-Telephone Maintenance Radio Service-Nicad Battery Test Jig

May–P/R Regency Informant Series-Do It Yourself Glass Mount Antenna-FBI Profile Pt 1-Airshows

Jun–P/R Radio Shack PRO 2022-FBI Profile Pt 2-Forest Products Radio Service-P/R Scan Manager Software

Jul–Aircraft Communication-Drive Up Windows-P/R PRO 2006-P/R Max 800 Antenna-Allocations 450.010 MHz to 450.990 MHz

Aug–Pilot To Metro And WX Radar Facilities-Airshow-FBI Profile Pt 3-Allocation Table

Sep–Cher Concert-P/R Discone Antennas-P/R Realistic PRO 36-Allocations 453.000 MHz to 453.975 MHz

Oct–P/R MON 58 Antenna-A Look Inside Your Antenna-800 MHz Aircraft Mobile Phone-P/R AR 2515

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Dec–Aftermarket Products For Portable Scanners-Allocations 454.000 MHz to 454.975 MHz

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Apr–PRO 2004 Display Backlight Fix-FCC Notice Of Inquiry-800 MHz Private Land Mobile Services-Trunked Systems-Public Safety Bands

May–PRO 2022 800 MHz MOD-P/R GRE Superconverter 9001-Amateur Radio And Scanning-Automated Maritime Telecommunications Systems-The Manufacturers Radio Service

Jun–P/R Icom IC 24AT-929 MHz Paging-P/R GRE 3001 Super Amplifier-Military Radio Systems-P/R Trident Highway Information Scanner

Jul–Icom IC 24AT Pt 2-P/R Alinco DJ 560T-Marine Radio Monitoring-200 MHz Band-P/R Startek Frequency Counters

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May–Speed Traps-Federal Aviation Administration (FAA)-Aircraft Allocation Table-Military Airlift Command(MAC)-US Forest Service-Legalities Of Monitoring

Jun/Jul–Amateur Radio In Space-NASA Frequencies-Nickel Hydride Rechargeables-Aeronautical Enroute Frequencies-Guide To AOR AR1000-GMRS-Frequency Search Table

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Oct–Ground Plane Antennas-P/R Optoelectronics R10 Interceptor-Automated Surface Observing System With National List-Trunking and Search Steps-Air to Air Refueling With National Map and Frequencies-Book Review: Beyond Police Call-Astronaut Hams

Nov–How The Signal Gets To Your Antenna-P/R Radio Shack PRO 2035-Motorola Coverage PLUS-Med Net Channels-P/R BC 200XLT-House Bill HR4922 Interception Of Digital and Other Communications-Air Traffic Control Centers With Maps-137 MHz Satellite Band-Oil Spill Clean Up Frequencies

Dec–Civil Air Patrol-Halfwave Dipole-Monitoring Military Satellites-SAR Search And Rescue-Personal Communications Service-State Highway Maintenance With State Frequencies

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Feb–P/R AOR AR8000-Space communications and you-Annual guide to Air Shows with frequencies-Cell phone & OJ-Nellis Air Force Base home of the ASAF Thunderbirds-dband Wideband and Multiband Antennas-Aviation; Alaska aviation frequencies-Tune In logging program-National car racing frequencies-P/R Opto Electronics Scout Model 25-FCC News; 911 compatability

Mar–P/R Radio Map-Space research frequencies-Phase inversion explained-P/R Ramsey scrambler/descrambler-Antennas, the yagi beam-Offutt Air Force Base-800MHz public safety frequencies Alaska through Massachusetts-Opto model 25 scout revisited-Microwave mobile band

Apr–USSN BBS Online Computer System-Aviation,

Norfolk VA-UHF Satellite terminal system-Antennas for weak signals-P/R Startek ATH-10 counter-800MHz public safety frequencies Maryland to Wyoming-Much More

May–900MHz Cordless phone-P/R Percon Spectrum Data base-Vehicle Tracking-Aviation, Florida Keys to Virgin Islands-136-174MHz Satellites-Scanner Antennas-Finding frequencies-February FCC public safety updates-FCC News

Jun–US Gov't trunking-Amateur tcvrs out of band operation-Aviation; Atlanta GA frequs-Shuttle flight profile-Direction finding for scanners-Dayton 95-Call Boxes-Mar. FCC Updates

Jul–Cubical quad antenna-US Customs Service-Monitoring 800MHz Trunked systems-To10 shuttle MIR frequs-P/R AOR AR2700-Beginners corner purchasing a scanner-Special emergency radio service-April FCC updates-P/R ICOM R7100

Aug–US Immigration & Naturalization Service-New Frequencies Allocations-Antennas for those new frequencies-FCC Call Signs-Railroad Monitoring w/ frequencies-Transportation; E central MN, NW Wisconsin-SCPC Comms-Jim 51 Preamp-EMMRS-May FCC updates

Sep–Bureau Alchol Tobacco & Firearms Pt. 1-Antennas maximise signal to noise ratio-Transportation Ptld OR-The future of space comm-P/R Uniden BC-9000-Police Monitoring-June FCC Updates-GTE Tele Go-Book Review Cheek 3

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Nov–Editorial "Integrity"-Looking for your Federal Gov't-Lightning protection & long wire beams-Law enforcement communications security-New cordless phones-10 commandments of scanning-Transportation; Kansas City KS & Missouri areas-The IRIDIUM System-P/R AOR SDU 5000-Public safety; Nassau County NY-FCC license applications for Aug.

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Mar–Police Call Plus 1996-P/R M1200 Decoder Card-US Secret Service protecting the president-Beam model antennas-Scanning the Internet-The Other Half, New Years Resolutions-Transportation Burlington Alabama-Phase Three Amateur Satellites-Pro 26 Technical notes-Public Safety Catskill Region New York State-FCC license applications-FCC News Commercial mobile radio services annual report

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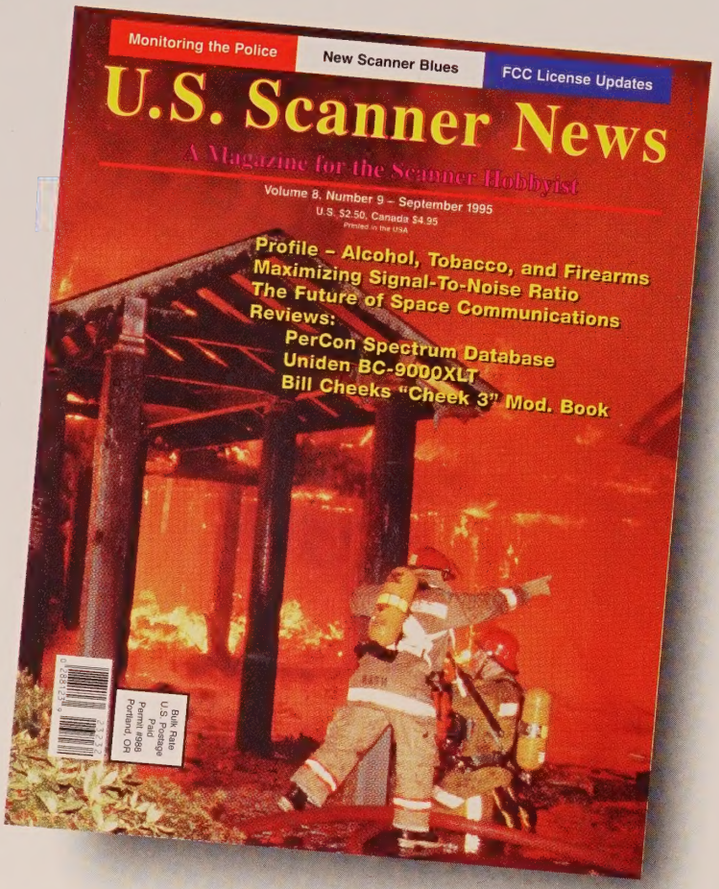

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You Won't Miss a Thing With SCOUT™ Reaction Tune

*Scanner not included

The SCOUT™ Has Taken Tuning Your Receiver To a New Dimension

Featuring Automatic Tuning of your AR8000 and AR2700 with the Optoelectronics Exclusive, Reaction Tune (Pat.Pend). Any frequency captured by the Scout will instantly tune the receiver. Imagine the possibilities! End the frustration of seeing two-way communications without being able to pick up the frequency on your portable scanner. Attach the Scout and AR8000/2700 to your belt and capture up to 400 frequencies and 255 hits per frequency. Or mount the Scout and AR8000/2700 in your car and cruise your way into the future of scanning. A simple interface cable will connect you to a whole new dimension of scanning.

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The Scout will also Reaction Tune and Memory Tune Icom CI-V receivers: (R7000, R7100, and R9000) and (Pro 2005/6 equipped with OS456, Pro 2035 equipped with OS535). Download the Scout frequencies to a PC with the Scout Utility Disk and CX-12AR (optional), then compare them to the Spectum CD-ROM/PerCon FCC Database (optional).

Act Now!! Let the Scout Reaction Tune you into The World of Scanning

SCOUT™ $449

Features

- Automatically tunes these receivers with Reaction Tune (Pat.Pend.) CI-V receivers (ICOM's R7000, R7100, and R9000), (Pro 2005/2006 equipped with OS456, Pro 2035 equipped with OS535) or AOR models (AR2700 and AR8000).
- Records and saves 400 unique frequencies
- Records 255 hits on each frequency in memory
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- View frequencies in RECALL mode
- 10 digit LCD with EL Backlight
- 16 Segment RF signal strength bargraph
- CX-12AR Computer Interface (optional)
- PC Utility Disk for downloading memory to PC
- Rapid charge NiCads with 10 hour discharge time
- Scout Spectrum CD-ROM/PerCon FCC database (optional)
- AC Adaptor/Charger
- DB 32 VHF/UHF mini-antenna shown with Scout (optional)
- Distinctive Beeper/Vibrator indicate frequency hits

At right: Scout shown with CLIPMATE™. A handy windshield mount for Scout, for quick access and visibility.

CLIPMATE™ $25.00

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